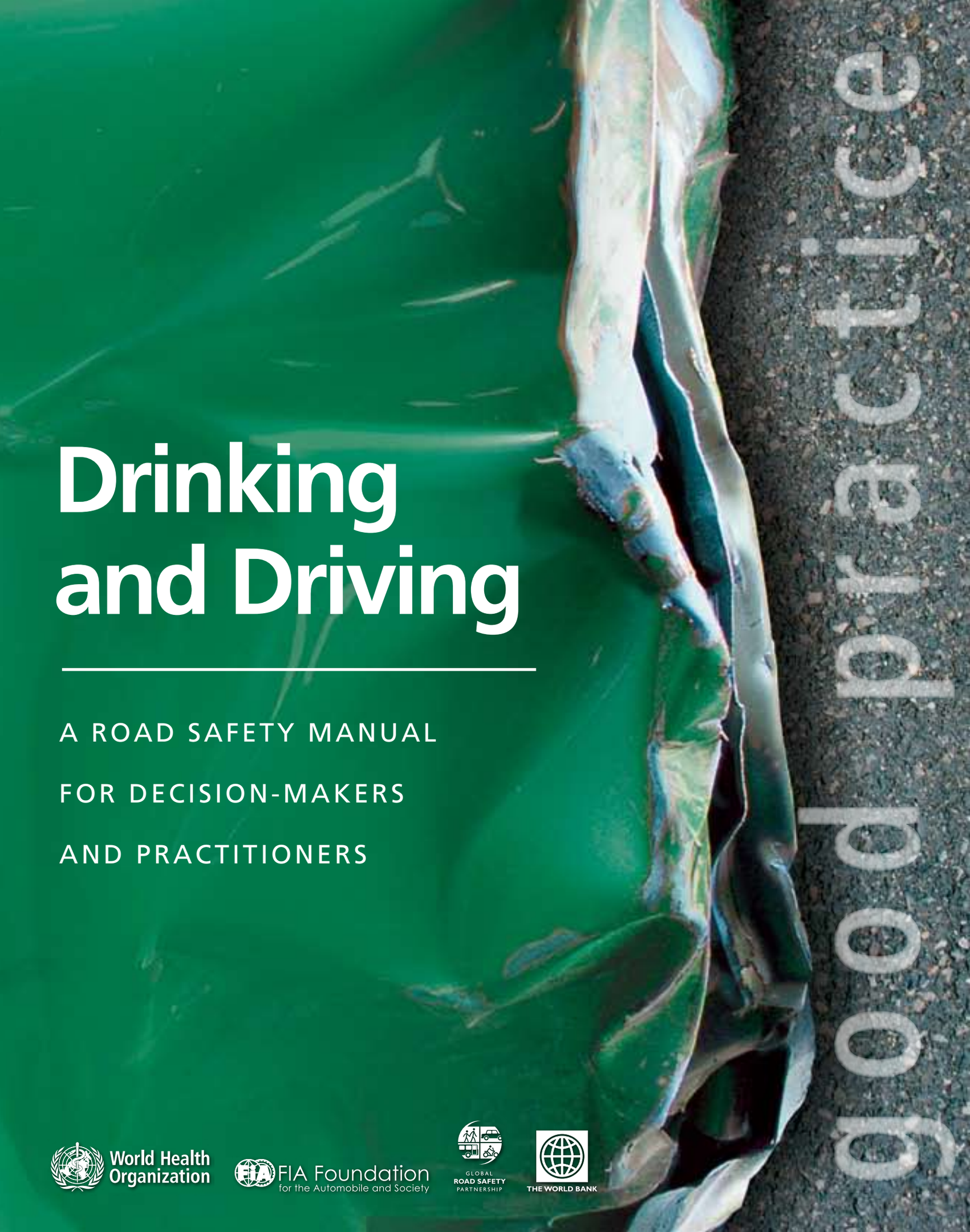

Drinking and Driving

A ROAD SAFETY MANUAL FOR DECISION-MAKERS AND PRACTITIONERS

World Health Organization
FIA Foundation for the Automobile and Society
GLOBAL ROAD SAFETY PARTNERSHIP
THE WORLD BANK

Drinking and Driving

A road safety manual for decision-makers and practitioners

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The World Bank

Drinking and Driving: a road safety manual for decision-makers and practitioners

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Preface

Road traffic injuries are a major public health problem and a leading cause of death and injury around the world. Each year nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes, mostly in low-income and middle-income countries. As well as creating enormous social costs for individuals, families and communities, road traffic injuries place a heavy burden on health services and economies. The cost to countries, possibly already struggling with other development concerns, may well be 1%–2% of their gross national product. As motorization increases, road traffic crashes are a fast-growing problem, particularly in developing countries. If present trends continue unchecked, road traffic injuries will increase dramatically in most parts of the world over the next two decades, with the greatest impact falling on the most vulnerable citizens.

Appropriate and targeted action is urgently needed. The *World report on road traffic injury prevention,* launched jointly in 2004 by the World Health Organization (WHO) and the World Bank, identified improvements in road safety management that have dramatically decreased road traffic deaths and injuries in industrialized countries that have been active in road safety. The report showed that the use of seatbelts, helmets and child restraints has saved thousands of lives. The introduction of speed limits, the creation of safer infrastructure, the enforcement of blood alcohol concentration limits and improvements in vehicle safety, are all interventions that have been tested and repeatedly shown to be effective.

The international community must now take the lead in encouraging good practice in road safety management and the take up of these interventions in more countries, in ways appropriate to their particular settings. To speed up such efforts, the United Nations General Assembly passed a resolution on 14 April 2004 urging greater attention and resources to be directed towards the global road safety crisis. Resolution 58/289 on "Improving global road safety" stressed the importance of international collaboration in the field of road safety. A further resolution (A58/L.60), passed in October 2005, reaffirmed the commitment of the United Nations to this issue, encouraging Member States to implement the recommendations of the *World report on road traffic injury prevention,* and commending collaborative road safety initiatives so far undertaken towards implementing resolution 58/289. In particular, it encouraged Member States to focus on addressing key risk factors, and to establish lead agencies for road safety.

To contribute to the implementation of these resolutions, the Global Road Safety Partnership (GRSP), the World Health Organization, the FIA Foundation for the Automobile and Society, and the World Bank, have collaborated to produce a series of manuals aimed at policy-makers and practitioners. This manual is one of them. Each provides step-by-step guidance to countries wishing to improve road safety and

to implement the specific road safety interventions outlined in the *World report on road traffic injury prevention*. They propose simple, effective and cost-effective solutions that can save many lives and reduce the shocking burden of road traffic crashes around the world. We would encourage all to use these manuals.

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Contributors and acknowledgements

This manual was drafted under contract to GRSP by a team from ARRB Transport Research (Australia) and the Transport Research Laboratory (UK). Parts of the manual have also been taken from *Helmets: a manual for decision-makers and practitioners,* the first manual in this series. Many people were involved in its preparation as authors, peer reviewers, workshop participants and technical editors. GRSP expresses sincere thanks to them all.

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Executive summary

The consumption of alcohol, even in relatively small amounts, increases the risk of being involved in a crash for motorists and pedestrians. Not only does alcohol impair processes critical to safe road use, such as vision and reaction time, it is also associated with impaired judgement and so is often linked to other high-risk road use behaviours such as speeding or not using seat-belts.

In many countries, research indicates that considerable proportions of drivers, motorcyclists and pedestrians have alcohol in their blood in sufficient concentrations to impair their road use skills. While the profile of drink-drivers differs somewhat between regions, there are a number of factors that increase the risk of crashes involving drinking and driving. For example, young male drivers are at a high risk of such crashes, and crashes involving alcohol are more frequent at night.

Unfortunately, in many countries, the scale of the problem is not well understood, there is little public awareness of the problem and legislation and enforcement are often inadequate. The *World report on road traffic injury prevention* identifies the effectiveness of programmes aimed at drinking and driving as a proven effective measure to reduce death and injury on the road.

The purpose of this manual is to inform readers of practical ways to develop coordinated and integrated programmes to reduce drinking and driving (including riding motorcycles) within a country. The manual is aimed at addressing drinking and driving among drivers. Commercial drivers are an especially important group to address in terms of drinking and driving because of the large number of passengers they can carry and/or the number of kilometres they are likely to travel. While impaired pedestrians are acknowledged as a problem, this issue is not addressed here.

The manual is aimed at policy-makers and practitioners, and draws on experience from countries that have succeeded in reducing drinking and driving. It provides the background evidence to start a drinking and driving programme, and takes the user through the steps needed to undertake a problem assessment in a country. It then explains how to plan and implement a programme, including setting up a working group, developing a plan, examples of laws and enforcement needed, how to develop public education and publicity campaigns, and finally how to evaluate the programme.

In developing this manual the authors have drawn on case studies from around the world to illustrate "good practice". Examples from low and middle-income countries are given wherever possible, but it is a reflection on the lack of attention given to the issue in many countries that most examples are from highly motorized countries.

Introduction

Introduction

Background to the series of manuals

The World Health Organization (WHO) dedicated World Health Day 2004 to the issue of road safety. Events marking the day were held in more than 130 countries to raise awareness about road traffic injuries, stimulate new road safety programmes and improve existing initiatives. On the same day, the WHO and the World Bank jointly launched the *World report on road traffic injury prevention,* highlighting the growing pandemic of road traffic injuries. The report discusses in detail the fundamental concepts of road traffic injury prevention, the impact of road traffic injuries, the main causes and risk factors for road traffic crashes, and proven and effective intervention strategies. It concludes with six important recommendations that countries can follow to improve their road safety record.

Recommendations of the *World report on road traffic injury prevention*

1. Identify a lead agency in government to guide the national road traffic safety effort.
2. Assess the problem, policies, institutional settings and capacity relating to road injury.
3. Prepare a national road safety strategy and plan of action.
4. Allocate financial and human resources to address the problem.
5. Implement specific actions to prevent road traffic crashes, minimize injuries and their consequences and evaluate the impact of these actions.
6. Support the development of national capacity and international cooperation.

The report stresses that any actions taken by countries to prevent road traffic injuries need to be based on sound scientific evidence, and should be culturally appropriate and tested locally. However, in its fifth recommendation, the report makes it clear that there are several "good practices" – interventions already tried and tested – that can be implemented at low cost in most countries. These include strategies that address some of the major risk factors for road traffic injuries, such as:

- setting laws requiring installation and use of seat-belts and child restraints for all occupants of motor vehicles;
- requiring riders of motorcycles to wear helmets;
- establishing and enforcing low blood alcohol concentration limits;
- setting and enforcing speed limits;
- managing existing road infrastructure to increase safety.

A week after World Health Day, on 14 April 2004, the United Nations General Assembly passed a resolution calling for greater attention and resources to be directed towards road safety efforts. The resolution recognised that the United Nations system should support efforts to tackle the global road safety crisis. At the same time, it commended WHO and the World Bank for their initiative in launching the *World report on road traffic injury prevention*. It also invited WHO, working in close cooperation with the United Nations Regional Commissions, to act as coordinator on road safety issues within the United Nations system.

Following the mandate conferred on it by the United Nations General Assembly, WHO has helped develop a network of United Nations and other international road safety organizations – now referred to as the "United Nations Road Safety Collaboration". The members of this group have agreed common goals for their collective efforts, and are initially focusing attention on the six recommendations of the *World report on road traffic injury prevention*.

A direct outcome of this collaboration has been the establishment of an informal consortium consisting of WHO, the World Bank, the FIA Foundation for the Automobile and Society and the Global Road Safety Partnership (GRSP). This consortium is working to produce a series of "good practice" manuals covering the key issues identified in the *World report on road traffic injury prevention*. The project arose out of the numerous requests made to the WHO and the World Bank by road safety practitioners around the world, especially those working in low and middle-income countries, asking for guidance in implementing the report's recommendations.

The manuals are aimed at governments, non-governmental organizations and road safety practitioners in the broadest sense. Written in an accessible manner, they provide practical steps to implement each recommendation in a way identified as good practice, while also making clear the roles and responsibilities of all those involved. The manuals are all based on a common format that was used in a similar document on increasing seat-belt use, developed by the FIA Foundation for the Automobile and Society in 2004. Although primarily intended for low and middle-income countries, the manuals are applicable to a range of countries and adaptable to different levels of road safety performance. Each manual includes case studies from developed and developing countries.

The *World report on road traffic injury prevention* advocates a comprehensive systems approach to road safety – one that addresses the road, the vehicle and the user. Its starting point is that to effectively tackle road traffic injuries, responsibility needs to be shared between governments, industry, non-governmental organizations and international agencies. Furthermore, to be effective, road safety must have commitment and input from all the relevant sectors, including those of transport, health, policy-making and law enforcement. These manuals also reflect the views of the report; they too advocate a systems approach and – following the principle that road safety should be pursued across many disciplines – they are targeted at practitioners from a range of sectors.

Background to the drinking and driving manual

Why was the manual developed?

Road users who are impaired by alcohol have a significantly higher risk of being involved in a crash. A survey of studies conducted in low and middle-income countries found that alcohol was present in the blood of between 4% and 69% of injured drivers, 18% to 90% of crash-injured pedestrians and 10% to 28% of injured motorcyclists *(1)*.

Programmes addressing the issue of crashes involving drinking and driving have been effective in several countries where they have included legislation and enforcement. This manual seeks to provide practical advice to road safety practitioners on how to conduct such programmes. It follows on from the *World report on road traffic injury prevention*, which describes how alcohol misuse contributes to injuries and fatalities among vehicle occupants, riders and pedestrians. The manual is one of a series providing, in an accessible form, practical advice on the steps necessary for improving road safety.

Target audience

The manual provides practical advice for countries that want to reduce the incidence of road crashes involving drinking and driving, locally or at a national level. It is targeted at governments, non-governmental organizations and road safety practitioners, particularly those in low and middle-income countries where alcohol is consumed by a large proportion of the population. The list of possible users will vary according to the country and its current situation with regard to alcohol consumption patterns and road safety activity, but will include:

- policy-makers and decision-makers
- members of the judiciary
- politicians
- police officers
- road safety professionals
- health professionals
- manufacturers, suppliers and retailers of alcohol beverages; owners of licensed premises and hospitality venues
- employers in the public and private sectors
- non-governmental organizations
- insurance industry personnel
- school and college teachers
- researchers on road safety and alcohol-related harm
- instructors in driving and road safety.

Although aimed particularly at low and middle-income countries with little legislation and few intervention programmes, it is intended to be useful for all countries.

What does the manual cover and how should it be used?

Achieving reductions in drink-drive road crashes will typically involve working systematically through a series of steps. Exactly how many steps are needed will depend on how much is already in place in a particular country in terms of legislation and intervention programmes.

This manual helps users identify which steps are relevant to their country's situation, and then provides the practical advice needed to implement the steps. As well as focusing strongly on technical measures, the manual also describes the institutional structures that need to be in place for a programme aimed at reducing crashes involving drinking and driving to be successful.

While alcohol-impaired pedestrians are known to be involved in some crashes, there is little practical experience in dealing with this as a road safety issue. This manual is therefore restricted to drinking and driving, including riding motorcycles.

What is covered?

Module 1 explains **why interventions to address alcohol-related road crashes are needed**. It describes how alcohol affects driving performance and contributes to crashes and resultant injuries among drivers, riders and pedestrians.

Module 2 guides the user through the process of **assessing a country's situation in relation to patterns of alcohol consumption and its impact on road crashes**. The section outlines the data needed for a good diagnosis of the problem and for identification of gaps in the mechanisms in place to address it.

Module 3 is about **designing and implementing a drinking and driving programme**, including how to gain political and community support for a programme through establishing a stakeholder working group. It also describes how to draw up plan of action that identifies the problem, sets objectives, timeframes and targets, and estimates the necessary resources. Module 3 also looks at a range of interventions for reducing the impact of drinking and driving, including laws and law enforcement, publicity campaigns and appropriate medical responses for casualties of crashes involving drinking and driving.

Module 4 is about **assessing the impact of a programme in terms of the specified programme objectives**. This includes identifying the data that need to be collected before beginning a campaign.

Case studies, in the form of boxed text, are included throughout the manual. These examples have been chosen to illustrate processes and outcomes, with experiences from a wide range of countries, reflecting regional, cultural and socio-economic diversity.

How should the manual be used?

The manual is not intended to be prescriptive, but rather adaptable to a particular country's current needs. Each module contains flowcharts and checklists to help readers determine where their country stands with regard to crashes involving drinking and driving, and to take those steps offering the greatest potential for improvement. The modular structure of the manual is intended to help this process of using only the relevant sections of the document.

Readers are encouraged to read the entire manual; however, the various sections may be more relevant to some countries than to others. Nonetheless, all users will probably benefit from reading Module 2, enabling them to assess their own situation and then pick particular actions to undertake. The choices made at this point will determine which of the remaining sections are most useful.

What are the limitations of this manual?

This manual is not meant to be comprehensive. It draws upon the experience of its contributors to identify practical and effective steps that can be taken to prevent crashes involving drinking and driving, and thus partly reflects the views of those involved in its production. There may well be successful interventions that are not reported here. Similarly, the case studies – used to illustrate processes, good practice and practical constraints – are not exhaustive but merely illustrate ideas presented in the main text.

As the manual aims primarily to provide guidance to countries in the early stages of developing and implementing programmes to prevent alcohol-related crashes, it does not provide extensive information on general alcohol issues. The manual concentrates on the three main topics of law regarding drinking and driving, enforcement and public education. Effective actions on these topics – taken together – will have a beneficial effect. Other possible interventions, such as "alcolocks" (devices built into vehicles to prevent drunk drivers from using the vehicle), which are under development and trial in some high-income countries, are not covered.

This manual is restricted to impairment due to alcohol. Other reasons for impairment, such as drugs or fatigue, are not considered here. It also focuses on drinking and driving (including riding motorcycles). Impaired pedestrians are known to be a problem, but there are few practical examples about how to address this.

How was the manual developed?

The manual was based on a standard format developed by the four partner organizations, the GRSP, WHO, the World Bank and the FIA Foundation for the Automobile and Society and was reviewed externally. The format was not meant to be rigid, but to provide a flexible structure that, where possible, would unify the series of manuals in their form and approach.

An advisory committee of experts from the different partner organizations oversaw the process of developing each manual and provided guidance on its content. A small editorial committee for each manual then coordinated its technical content.

An outline of this manual was produced by GRSP, as the project leader, with additional support provided by the World Bank and WHO. Drafting was undertaken by a team from ARRB and TRL, under contract to GRSP. Technical sections of the document were prepared by organizations or individuals with particular expertise in an area. These people further developed the outline of their sections, reviewed the relevant literature and contributed to the technical content, ensuring it reflected the latest scientific views on good practice. The manual was subject to two rounds of peer review, and a near final draft was also discussed in depth at two workshops with practitioners in India that led to further modifications.

Dissemination of the manual

This manual is being translated into a number of major languages, and countries are encouraged to translate the document into local languages. The manual will be disseminated widely through the distribution channels of all four organizations involved in the series of manuals.

The manual is available in PDF format to be downloaded free from the websites of all partner organizations. Visit GRSP's website at www.grsproadsafety.org

How to get more copies

Further copies of this manual can be ordered from:
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1

Why is a drinking and driving programme necessary?

Why is a drinking and driving programme necessary?

THIS MODULE provides the user with background information on the problem of crashes involving drinking and driving worldwide, as well as the rationale for interventions aimed at reducing such crashes. The information and recommendations provided in this module are important tools for persuading political leaders and the public to support a programme that deals with drinking and driving.

The sections in this module are structured as follows:

- **1.1 Crashes involving drinking and driving worldwide:** The module begins by describing the magnitude of the problem, and how alcohol-related crashes are a leading cause of death and disability.
- **1.2 Why drinking and driving is a problem:** This section describes what alcohol is and how it impacts driving performance. It shows the relationship between alcohol consumption and road traffic crashes. This section also discusses how alcohol affects the assessment, management and rehabilitation of those involved in a motor vehicle collision.
- **1.3 Who is most at risk?** Briefly this section discusses some of the major characteristics and risk factors for drinking and driving. It also highlights the extent and patterns of drinking worldwide.
- **1.4 How can crashes involving drinking and driving be reduced?** The module concludes by looking at the leading interventions for addressing drinking and driving. These include legislation, education and advocacy. Each of these interventions will be discussed in detail in the following modules.

As mentioned in the Introduction, this manual is focused on drinking and driving only, although alcohol plays a significant role in pedestrian collisions as well. However, many of the principles and technical guidance that are provided in this manual apply equally well to vehicle drivers, motorcyclists and bicyclists, as well as pedestrians.

1.1 Crashes involving drinking and driving worldwide

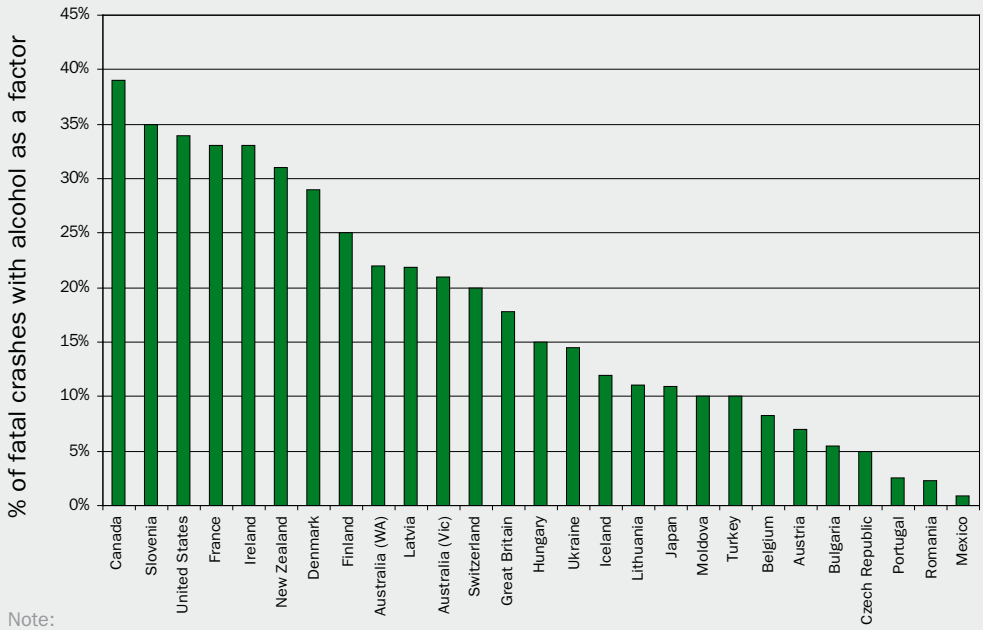
Apart from a few countries where alcohol is prohibited, impairment by alcohol is an important factor influencing both the risk of a road traffic crash as well as the severity and outcome of the injuries that result from it. The frequency of drinking and driving varies between countries, but decades of research have shown that drink-drivers have a significantly higher risk of being involved in a road crash than drivers who have not consumed alcohol.

1.1.1 Variations in crashes involving drinking and driving by country

In most high-income countries about 20% of fatally injured drivers have excess alcohol in their blood *(1),* i.e. blood alcohol concentration (BAC) in excess of the legal limit. In contrast, studies in low- and middle-income countries have shown that between 33% and 69% of fatally injured drivers and between 8% and 29% of non-fatally injured drivers had consumed alcohol before their crash *(1).*

Figure 1.1 provides an overview of the role of alcohol in fatal crashes in selected countries.

Figure 1.1 Drink-drivingas a factor in fatal crashes (2002, 2003 or 2004 data)



Note:
Austria: the figure (7%) is largely underestimated. This is due to the fact that in Austria it is not allowed to check alcohol on a dead person.
Portugal: data are largely underestimated, since not all drivers are checked.

Source: Unpublished data from: *Working group on achieving ambitious road safety targets: responses to the survey on road safety performance*, Joint OECD/ECMT Transport Research Centre, 2005.

Few countries have sophisticated surveillance systems to monitor the involvement of alcohol in all crashes. In addition, definitions for what constitutes a drink-driving crash might differ between countries, as might the legal BAC limit or requirements for testing crash victims. For these reasons direct comparisons between countries are difficult to make. Bearing in mind some of these complications, studies from a selection of countries indicate that:

- between 26% and 31% of non-fatally injured drivers in South Africa have BAC levels exceeding the country's limit of 0.08 g/100 ml *(2);*
- in Thailand, nearly 44% of traffic injury victims in public hospitals had BAC levels of 0.10g/100ml or more *(3),* while an in-depth study of nearly 1000 motorcycle collisions revealed that alcohol was a factor in 36% of the collisions *(4);*
- in Bangalore, India, 28% of crashes involving males over 15 years were attributable to alcohol *(5);*
- in Colombia, 34% of driver fatalities and 23% of motorcycle fatalities are associated with speed and/or alcohol *(6);*
- in Sunsai and Dharari, Nepal, 17% of 870 road traffic collisions were attributed to alcohol consumption. Of those drinking and driving, 50% were cyclists, 28% were motorcyclists, 17% bullock cart drivers and 5% truck drivers *(7).*
- in the United States of America half a million people are injured and 17 000 killed every year in traffic crashes involving drinking and driving. Almost 40% of all youth road traffic fatalities are directly related to alcohol consumption *(8).*
- in Sweden, the Netherlands and the United Kingdom, the proportion of fatally injured drivers with excess alcohol is around 20%, although the legal limits in these countries differ considerably, being 0.02 g/100 ml, 0.05 g/100 ml and 0.08 g/100 ml, respectively *(9).*

BOX 1.1: **Alcohol-related road traffic deaths in South Africa**

According to the South African national injury mortality surveillance system, there were 25 361 fatal injuries registered at 32 of the state mortuaries in 2001. This represents approximately 35% of all non-natural mortality in South Africa in that year. Transport-related deaths accounted for 27% of all the fatal injuries.

Pedestrians were the group of road users most frequently killed (37.3%), followed by passengers of vehicles (17.4%), drivers (14.0%) and cyclists (3.1%).

Alcohol is a major risk factor for all types of fatal road traffic injury in South Africa. Tests for BAC level were conducted on 2372 (or 34.6%) of the 6859 transport-related deaths. More than half (51.9%) of all transport-related deaths had elevated levels of BAC, and of these positive cases, 91% recorded BAC levels of 0.05 g/100 ml or higher.

Pedestrians, followed by drivers, were most likely to be BAC-positive (see table below).

Blood alcohol concentration (in g/100 ml)

	Zero %	0.01–0.04 %	0.05–0.14 %	0.15–0.24 %	≥ 0.25 %
Pedestrians	37.5	5.4	12.0	20.5	24.7
Passengers	62.6	4.7	14.0	13.7	5.0
Drivers	48.2	5.3	18.2	18.8	9.5
Cyclists	61.3	3.2	15.1	14.0	6.5

Pedestrian fatalities also had the highest mean BAC levels (0.20 g/100 ml). Over 50% of drivers killed had elevated BAC levels and the mean level for drivers – 0.17 g/100 ml – was more than three times South Africa's current legal limit for driving (0.05 g/100 ml).

Source: *(1)*

1.1.2 The economic impact of crashes involving drinking and driving

Very little data is available on the costs of crashes involving drinking and driving. WHO has figures on the cost of chronic alcohol use for many countries *(10),* but the costs of road trauma are not presented separately. In the United States, the total economic cost of motor vehicle crashes in 2000 was estimated at US$ 230.6 billion, with drink-driving crashes accounting for US$ 51.1 billion or 22% of all economic costs *(8)*. However, the United States and developing countries are not directly comparable because of variables including transport infrastructure, differences in safety standards, motorization growth rate and the economic demography of countries.

Applying recent data on the incidence of drink-driving crashes in developing countries to estimates of the total cost of road crashes in those countries (as outlined in *the World report on road traffic injury prevention*) can establish robust estimates *(1)*. For example, in South Africa it has been estimated that alcohol is a factor in 31% of non-fatal crashes. Applying this figure to the estimated hospital costs attributed to road crashes for South Africa in the WHO report of US$ 46.4 million would give a total cost to the health system of around US$ 14 million for crashes involving drinking and driving.

In Thailand, the total cost of road crashes has been estimated at $US 3 billion *(11)*. Recent estimates of alcohol involvement in that country indicate at least 30% of crashes are linked to alcohol, which means alcohol is a factor in costs to Thailand of about $US 1 billion.

1.2 Why is drinking and driving a problem?

Alcohol has many functions in society and bears important cultural, religious and symbolic meanings in most countries. But it is also a drug with many toxic effects and other dangers such as intoxication and dependence.

1.2.1 The effects of alcohol on driving

NOTE

What is alcohol?

The term "alcohol" in its purest sense denotes "ethyl alcohol or ethanol", a liquid which is obtained from the action of yeast on sugar, but in colloquial terms it usually refers to "a drink such as beer, wine and whiskey that can make people drunk".

Source: *Collins English Dictionary*

The immediate effects of alcohol on the brain are either depressing or stimulating in nature, depending on the quantity consumed (see Table 1.1). Either way, alcohol results in impairment which increases the likelihood of a crash since it produces poor judgement, increased reaction time, lower vigilance and decreased visual acuity. Physiologically, alcohol also lowers blood pressure and depresses consciousness and respiration. Alcohol also has analgesic and general anaesthetic properties.

Alcohol can impair judgement and increase crash risk even at relatively low BAC levels. However, the effects become progressively worse as the BAC increases. Not only do judgement and reaction time suffer, but vision also deteriorates. Apart from its direct impact on crash outcomes, alcohol is believed to affect other aspects of driver safety such as seat-belt wearing, helmet use, and speed choice. Although detailed consideration of drugs other than alcohol has been deliberately omitted from this manual, the consumption of alcohol, due partly to its tendency to reduce inhibition, is often associated with the use of other drugs which can impact upon driving performance *(12)*.

1.2.2 The effects of alcohol on risk of a crash

Alcohol impairment has a significant effect on the crash risk of drivers, riders and pedestrians; it is routinely reported as one of the most serious contributing factors to road crashes in motorized countries.

Drivers who have been drinking have a much higher risk of involvement in crashes than those with no alcohol in their blood, and this risk grows rapidly with increasing blood alcohol concentration (see Box 1.1). For motorcyclists, having a BAC over 0.05 g/100 ml has been estimated to increase crash risk by up to 40 times compared to having a zero BAC *(14)*.

Table 1.1 **Effects of BAC on the body and performance**

BAC (g/100ml)	Effects on the body
0.01–0.05	Increase in heart and respiration rates
	Decrease in various brain centre functions
	Inconsistent effects on behavioural task performances
	Decrease in judgment and inhibitions
	Mild sense of elation, relaxation and pleasure
0.06–0.10	Physiological sedation of nearly all systems
	Decreased attention and alertness, slowed reactions, impaired coordination, and reduced muscle strength
	Reduced ability to make rational decisions or exercise good judgment
	Increase in anxiety and depression
	Decrease in patience
0.10–0.15	Dramatic slowing of reactions
	Impairment of balance and movement
	Impairment of some visual functions
	Slurred speech
	Vomiting, especially if this BAC is reached rapidly
0.16–0.29	Severe sensory impairment, including reduced awareness of external stimulation
	Severe motor impairment, e.g. frequently staggering or falling
0.30–0.39	Non-responsive stupor
	Loss of consciousness
	Anaesthesia comparable to that for surgery
	Death (for many)
0.40 & greater	Unconsciousness
	Cessation of breathing
	Death, usually due to respiratory failure

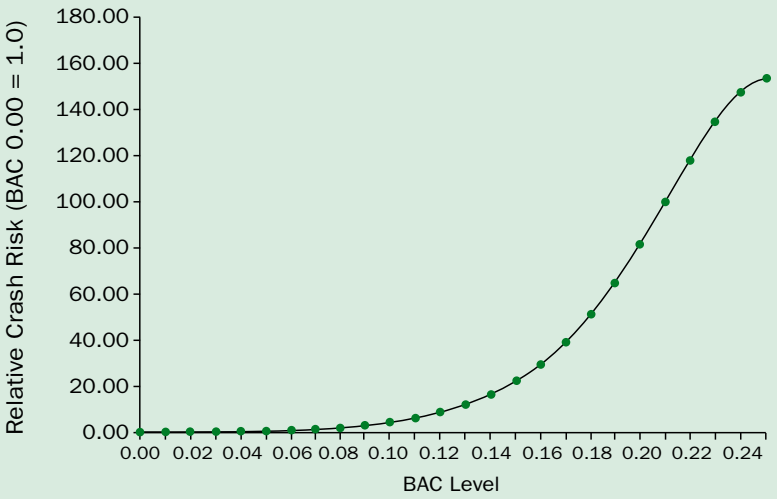
Source: *(13)*

BOX 1.2: **Risk of drink-driver involvement in police-reported crashes**

In 1964 a case-control study was carried out in Michigan in the United States known as the Grand Rapids study *(15)*. It showed that drivers who had consumed alcohol had a much higher risk of involvement in crashes than those with a zero BAC, and that this risk increased rapidly with increasing blood alcohol levels. These results were corroborated and improved upon by studies in the 1980s, 1990s and in 2002 *(16–18)*. These studies provided the basis for setting legal blood alcohol limits and breath content limits in many countries around the world.

The studies found that the relative risk of crash involvement starts to increase significantly at a blood alcohol concentration level of 0.04 g/dl and that at 0.10 g/100 ml the crash risk relative to a zero BAC is approximately 5, while at a BAC of 0.24 g/100 ml the crash risk is more than 140 times the risk relative to a zero BAC (see Figure 1.2).

Figure 1.2: Estimated relative fatality risk for drinking drivers by age and sex in single-vehicle crashes



Source: *(18)*

1.2.3 The effects of alcohol in the post-crash phase

It is clear from the previous section that alcohol compromises driving performance and thus increases the risk of a road traffic collision. But alcohol also has significant effects in the post-crash phase which should be borne in mind. These are summarised in Box 1.3.

BOX 1.3: **Why should alcohol levels be determined in road traffic victims?**

- Alcohol intoxication complicates the assessment and management of patients.
  - The effects of alcohol can mimic the symptoms of a head injury.
  - Alcohol intoxication predisposes the patient to more severe injuries.
  - Intoxicated patients may not report pain or tenderness.
  - Alcohol may interact with medications, particularly those used for pain relief and sedation.
  - Alcohol intoxication can complicate surgery and can influence the anaesthetist's choice of anaesthetic drug.
- Alcohol exacerbates underlying chronic diseases.
  - Patients with alcohol problems may have underlying medical and/or psychiatric conditions which can complicate their management.
  - Alcoholism intoxication may exacerbate pre-existing conditions such as cardiac disease, impaired blood clotting and infectious diseases.
- Alcohol increases recidivism.
  - Patients who are alcohol positive at the time of their injury are greatly at risk for subsequent re-injury.
  - Among drink-driving offenders, many repeatedly re-offend.
- Alcohol complicates outcome.
  - Intoxicated patients have an increased likelihood of sustaining some type of complication during their recovery phase – most notably an infection such as pneumonia.

1.2.4 How is alcohol measured?

Blood alcohol concentration is central to establishing a link between alcohol and road traffic crashes. Investigations into the role of alcohol in road crashes require that those where alcohol played a causal role be differentiated from those where it didn't. Although it is often difficult to attribute a crash to a particular cause or causes, decisions as to whether or not a crash was alcohol-related are often based on how much, if any, alcohol was present in the bloodstream of the road users involved.

The amount of alcohol that is contained within the bloodstream can be measured by testing a small sample of blood or urine, or through analysis of exhaled breath. The amount of alcohol within the bloodstream is described in terms of BAC. BAC is usually measured as:

- *grams* of alcohol per 100 millilitres of blood (g/100 ml)
- *milligrams* of alcohol per 100 millilitres of blood (mg/100 ml)
- *grams* of alcohol per decilitre (g/dl)
- *milligrams* of alcohol per decilitre (mg/dl)
- or other appropriate measure.

Legal BAC levels for driving vary from country to country, or state to state, throughout the world – ranging from 0.02 g/100 ml to 0.10 g/100 ml (see Table 1.2).

For the remainder of this manual, BAC is described in terms of *grams* of alcohol per 100 millilitres of blood.

Table 1.2 Blood alcohol concentration (BAC) limits for drivers by country or area

Country or area	BAC (g/100 ml)	Country or area	BAC (g/100 ml)
Australia	0.05	Luxembourg	0.05
Austria	0.05	Netherlands	0.05
Belgium	0.05	New Zealand	0.08
Benin	0.08	Norway	0.05
Botswana	0.08	Portugal	0.05
Brazil	0.08	Russian Federation	0.02
Canada	0.08	South Africa	0.05
Côte d'Ivoire	0.08	Spain	0.05
Czech Republic	0.05	Swaziland	0.08
Denmark	0.05	Sweden	0.02
Estonia	0.02	Switzerland	0.08
Finland	0.05	Uganda	0.15
France	0.05	United Kingdom	0.08
Germany	0.05	United Republic of Tanzania	0.08
Greece	0.05	United States of America*	0.10 or 0.08
Hungary	0.05	Zambia	0.08
Ireland	0.08	Zimbabwe	0.08
Italy	0.05		
Japan	0.00		
Lesotho	0.08		

* Depends on state legislation

Source: *(1)*

Breath alcohol concentration (BrAC), in contrast, is expressed as the weight of alcohol, measured in grams, in 210 litres of breath, or, measured in milligrams, in 210 millilitres of breath. There are known relationships between BrAC and BAC, which are used to relate breath alcohol tests to BAC and hence impairment levels.

Alcohol content in blood can be directly measured by a hospital laboratory. More commonly in law enforcement investigations, BAC is estimated from breath alcohol concentration (BrAC) measured with a machine commonly referred to as a breathalyser (note that different machines may have different conversion factors applied to relate BrAC to BAC).

There is accurate correspondence between blood alcohol and breath alcohol levels *(20)*. Because of the ease of administration, breath alcohol is more commonly measured in the road safety context.

Alcohol intoxication may also be assessed by trained medical staff in emergency units using clinical signs and symptoms.

NOTE

Evidence of alcohol involvement determined by level of intoxication

The International Classification of Disease (version 10) classifies the levels of alcohol intoxication as:

- **mild alcohol intoxication** – smell of alcohol on breath, slight behavioural disturbance in functions and responses, or slight difficulty in coordination.
- **moderate alcohol intoxication** – smell of alcohol on breath, moderate behavioral disturbance in functions and responses, or moderate difficulty in coordination.
- **severe alcohol intoxication** – severe disturbance in functions and responses, severe difficulty in coordination, or impaired ability to cooperate.
- **very severe alcohol intoxication** – very severe disturbance in functions and responses, very severe difficulty in coordination, or loss of ability to cooperate.

Source: *(21)*

1.3 Who is most at risk of a crash involving drinking and driving?

Road users, who are either repeat "offenders" or first time "offenders" with a very high BAC, constitute the highest risk groups for drinking and driving. Research on high risk road user groups has typically classified them in terms of their demographic characteristics or attitudinal variables.

1.3.1 Demographic characteristics of drink-drivers

In terms of demographic characteristics, a consistent picture of drink-drivers emerges across a number of studies *(22)*. These drivers are characterised as being:

- male
- aged 18–24 years old
- from a low socio-economic grouping
- single or divorced
- in a blue collar occupation
- of low education and limited literacy
- of low self-esteem.

In comparison, motorcyclists with BAC levels above the legal limit of 0.05 g/100 ml in the state of Victoria in Australia, compared with those below the alcohol limit *(21)* were found to be:

- male
- 26–40 years old
- 10–20 years licence experience
- riding without a helmet
- unlicensed

In the same study, the Australians found that intoxicated pedestrians were more likely to be male and between 31 and 59 years of age *(23)*. No other characteristics appear to differentiate well between intoxicated and non-intoxicated crash-involved pedestrians.

NOTE

Who is most at risk of a drink-drive crash?

Drivers and motorcyclists with any level of blood alcohol content (BAC) greater than zero are at higher risk of a crash than those whose BAC level is zero.

For the general driving population, as the BAC level increases from zero the risk of being involved in a crash starts to rise significantly at a BAC level of 0.04 g/100 ml.

Inexperienced young adults driving with a BAC level of 0.05 g/100 ml have a 2.5 times higher risk of a crash compared with more experienced drivers.

Young adults in the 20–29 years age group were estimated to have three times the risk compared with drivers aged 30 years and above, at all BAC levels.

Teenage drivers had more than five times the risk of a fatal crash compared with drivers aged 30 and above, at all levels of blood-alcohol content.

Teenage drivers with a BAC of 0.03 g/100 ml **carrying two or more passengers** were 34 times more at risk of a crash compared with drivers aged 30 years or more, with no alcohol, driving with one passenger.

Alcohol consumption by drivers puts **pedestrians and riders** of motorized two-wheelers at risk.

Source: adapted from *(1)*

1.3.2 Attitudinal characteristics of drink-drivers

Australian research has found that the population can be divided into four groups based largely on three key factors:

- their fear of being detected driving while impaired by alcohol;
- their fear of crashing;
- their acceptance of the 0.05 g/100ml BAC limit *(24)*.

The four groups were characterised as:

- **"believers"**, who had high fear of being caught or crashing, and who had the highest level of acceptance of a 0.05 BAC and associated countermeasures. They drank least on their last "drinking occasion";
- **"pressured"**, who also had high fear, but had lower acceptance of the 0.05 BAC limit and enforcement. They experienced social pressure to keep up with the group while drinking.
- **"deterred"**, who had lower levels of fear, but accepted the need for the 0.05 BAC limit and countermeasures;
- **"opposers"** who had low levels of fear of detection and of crashing, and low levels of acceptance of the 0.05 BAC and countermeasures. They drank most on the last "drinking occasion", and reported driving while impaired by alcohol more frequently than other groups.

The study concluded that "opposers" may well be the group with the highest risk of being involved in a drink-driving crash and are also likely to be those whose behaviour is most difficult to change.

1.3.3 Patterns of alcohol use worldwide

Patterns of alcohol use and the incidence of drink-driving vary considerably worldwide. In many countries where alcohol is consumed, those who drink also drive. Understanding drinking patterns and preventing hazardous and harmful alcohol consumption is a key component in reducing alcohol-related harm overall, including harm resulting from road crashes. Factors influencing the level of alcohol consumption in a country include environmental, socio-economic, religious, personal and behavioral issues.

The WHO *Global status report on alcohol 2004* examined the rates of abstainers, heavy drinkers and binge drinkers across countries and found considerable variations *(10)*. For example, the proportion of abstainers among the total adult population reported across countries ranged from a low of 2.5% in Luxembourg to a high of 99.5% in Egypt. Heavy drinkers (those who exceed a certain daily volume or quantity per occasion, or who drink every day) ranged from a low of 1.4% in India to a high of 31.8% in Colombia.

Apart from overall levels of consumption, drinking patterns are also relevant to the incidence of drinking and driving. Figure 1.3 shows the difference in drinking patterns in the world, ranging from 1 (least risky) to 4 (most risky). A large portion of risky drinking patterns appear to occur in many low or middle-income countries.

Figure 1.3 Drinking patterns worldwide

Source: *(25)*

BOX 1.4: **Drinking and driving in Spain**

In a study conducted in Spain the authors analysed drinking patterns among Spanish drivers. Based on self report, over 60% of drivers indicated that they were regular drinkers, and more than 25% drank at a dangerously high level. Respondents who drove regularly were more likely to drink and had a higher alcohol intake. Most drinkers reported driving after drinking and 145 acknowledged having driven "in a drunken state" during the previous year. Those who drank were more likely to have been involved in crashes.

Source: *(26)*

1.3.4 Characteristics of crash victims

Crashes involving drinking and driving often exhibit a number of characteristics.

Single vehicle crashes and high speed – drink-driving crashes often involve high speed and a single vehicle running-off the road. Many of these crashes also result in the vehicle hitting a fixed roadside object. In urban areas these can be signs or electricity poles, while in rural areas it is usually trees, culverts, bridge ends and fence posts.

Night and/or weekend crashes – drink-driving crashes occur more often at night (when more alcohol is consumed) and generally on weekends or periods of high leisure activity.

Increased severity of injury – this is partly because once a crash and the injury-causing impact has occurred, the existence of alcohol in the body of the crash victims works to limit the extent and level of recovery from injury.

NOTE

Alcohol and injury severity in Bangalore, India

The National Institute of Mental Health and Neurosciences, Bangalore [NIMHANS] estimated that 21% of people who sustained brain injuries during a crash were under the influence of alcohol (physician confirmed diagnosis) at the time and 90% had consumed alcohol within three hours prior to the crash. Patients with injuries subsequent to alcohol intoxication sustained a more injuries that were more severe than the non-intoxicated group. Compared to the non-intoxicated group, more of the intoxicated group required surgical interventions (8% and 5% respectively), more died (6.5% and 4% respectively) and more sustained neurological disabilities at discharge from hospital (13% and 9%).

Source: *(27)*

Although much of the research on alcohol-related crashes has focused on car crashes, many of the characteristics of alcohol-related motorcycle crashes are the same. A recent study in Thailand *(4)* indicated that compared to non-drinking riders, drinking riders tended to crash at night, to have more non-intersection crashes and more crashes on curves, were more likely to lose control, run off the road, violate a red signal, be inattentive, and for rider error to be a contributing cause of the crash. Drinking riders were five times more likely to be killed as non-drinking riders.

Compared to collisions involving non-impaired pedestrians, those involving alcohol-impaired pedestrians have been shown to be more likely to occur:

- during hours of darkness
- in business or commercial areas
- on roads of greater than 50 km/h speed limit
- at mid-block locations
- as a result of the pedestrian disobeying traffic laws *(28)*.

1.4 How can crashes involving drinking and driving be reduced?

Over the past few decades many industrialised countries have been successful in reducing the number of crashes caused by drink-drivers (see Box 1.5). Information about these experiences can be used to guide programmes in low and middle-income countries where alcohol is often an important risk factor for road traffic crashes. However, it must be recognised that low and middle-income countries today face additional problems on their roads, meaning that these lessons cannot be simply transferred between countries, but will need to be adapted to suit different contexts.

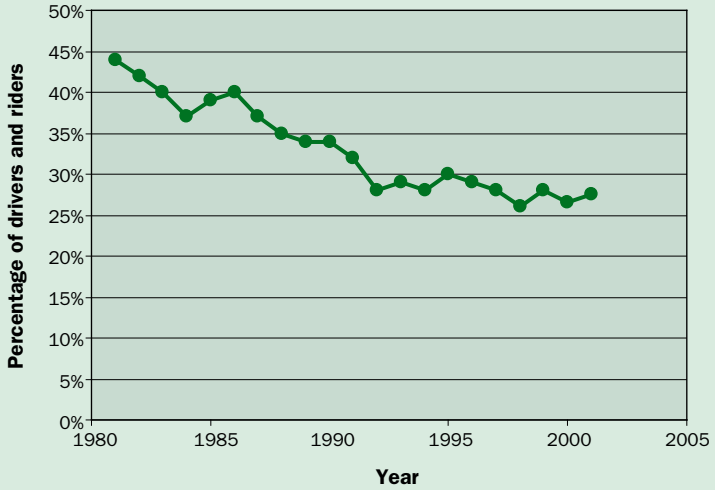
BOX 1.5: **Australia reduces drink-driving**

Australia embarked on a sustained programme to tackle crashes involving drinking and driving from the mid-1970s onwards. Substantial research information on the impairment effects of alcohol was collected, and this led to support for legislation setting out a maximum BAC level for drivers. In Australia the individual states, operating under the federal system of government, are responsible for most road safety issues. Consequently, the legal level adopted was not uniform across all states. Some adopted 0.05 BAC and others adopted 0.08 BAC.

Following the adoption of legal limits, large-scale police enforcement of these limits was undertaken in the 1980s. This was supported by a range of other interventions, including publicity, community announcements, community activity programmes, variations in alcohol licensing and distribution arrangements for alcohol. There was also ongoing monitoring of performance involving blood tests on drivers involved in crashes.

Over this 30-year period, alcohol as a factor in crashes has been almost halved in Australia (see Figure 1.4), and community attitudes to drink-driving have changed substantially so that currently there is a strong community view that such behaviour is socially irresponsible.

Figure 1.4 Percentage of fatally injured drivers and motorcycle riders with a BAC of 0.05 gm/100 ml or greater, Australia 1981–2001



Road crashes involving drinking and driving are a feature of the road-injury profile in many countries, and alcohol consumption appears to be an element of road user behaviour that is very difficult to address. Apart from the adverse influence of alcohol as a contributor to road crashes, the presence of alcohol in the body of a road crash victim adversely affects the diagnosis, management, and treatment of injuries. Countries looking to tackle this problem should consider the experiences of other countries where crashes involving drinking and driving have been reduced substantially. Their success generally rests on six pillars:

- strong political commitment to prevent drink-driving (see Box 1.5);
- legislation that clearly defines illegal (for driving) levels of BAC and penalties for drinking and driving offences;
- implementing "good practice";
- strong and well-publicised enforcement campaigns;
- public education to change attitudes to drinking and driving;
- strict and swiftly enforced penalties for those caught breaking the law.

The public must know why drinking and driving is both unsafe and anti-social, be aware that there are laws in place, perceive a high risk of being caught if they break the law, and know that if they are caught, there will be a heavy price to pay.

BOX 1.6: **Political commitment in France reduces the number of crashes**

In 2002, French President Jacques Chirac declared publicly that road safety would be one of the three major priorities of his presidential mandate. This political leadership is essential if difficulties with new, harsher, legislation are to be overcome. Penalties for driving under the influence of alcohol were increased and new laws were introduced.

France's road safety performance over the period 2002–2004 is spectacular – road deaths decreased by 32%. This is attributed to a combination of measures, but focusing particularly on speeding and alcohol-impaired driving *(27)*. With respect to alcohol-related crashes, measures included reducing the permitted BAC level from 0.08 (set in 1978) to 0.05, and 0.02 for bus drivers. Enforcement was increased – for example breath tests were increased by 15%. Stricter sanctions were introduced, increasing penalty points from 3 to 6 for a BAC between 0.05 and 0.08 (12 points lead to disqualification). As a result, alcohol-impaired driving decreased dramatically – almost 40% fewer incidents in 2004 compared with 2003. One researcher attributes 38% of the lives saved between 2003 and 2004 to improved behavior in terms of alcohol-impaired driving (*29*).

Even where the problem of crashes involving drinking and driving is considered to be relatively minor, for example, where motorization levels are low, countries should be proactive in monitoring the situation so that it can be managed and prevented from escalating.

Summary

- Drink-driving is a major road safety problem in many countries, although the extent of the problem is often unclear – especially in low and middle-income countries.
- Even in quite modest amounts, alcohol impairs the functioning of several processes required for safe road use, including vision and motor skills.
- Alcohol impairment increases the chance that all road user groups, including drivers, riders and pedestrians, will be involved in a crash.
- Research indicates that crashes involving drinking and driving have a number of characteristics, but these may differ considerably between regions.
- Experiences of both Australia and France show that concerted effort to implement effective interventions can have substantial effects on the level of injuries sustained in drink-drive crashes.
- A number of countermeasures to reduce drinking and driving have been systematically evaluated and shown to have a positive effect on reducing the occurrence of drink-driving.

NOTE

What works to reduce drink-driving?

The following practices have been found to act as deterrents for drink-driving.

- Setting BAC limits.
- Enforcement of BAC levels:
  - random and selective breath testing
  - severity of punishment
  - swiftness of punishment.
- Treatment of repeat offenders.
- Restrictions on young or inexperienced drivers:
  - lower BAC limits for younger drivers
  - licensing restrictions, e.g. graduated driver licensing.
- Designated driver and ride service programmes.
- Alcohol ignition interlocks.

Source: *(30)*

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2

Assessing the situation and choosing priority actions

Assessing the situation and choosing priority actions

MODULE 1 HIGHLIGHTED WHY it is important to invest in measures to reduce crashes involving drinking and driving. Before designing and implementing a programme aimed at achieving this, it is important to understand the current situation within your country or region so that appropriate interventions can be selected. The information you gain in this process will be essential in monitoring the progress of the programme that is developed.

The sections in this module provide guidance on the following issues:

- **2.1 Why do you need to assess the situation before deciding which measures to take?** Developing appropriate measures to address drinking and driving requires accurate data on the extent and characteristics of the problem in your country or region. The data you collect will be critical in designing a programme that is relevant and successful.
- **2.2 Collecting relevant data – where to begin:** There are numerous types of assessments that will provide you with the information you need to design an effective programme. This section provides guidance on:
  - collecting and assessing health and crash data on incidents involving alcohol – to assess the extent of the problem in your community and identify main target groups (section 2.2.1);
  - assessment of laws on or relevant to drinking and driving – to understand the current legal framework and whether changes may be important in order to implement a programme with potential for improving the situation (section 2.2.2–2.2.4);
  - stakeholder assessment – to identify the interest groups, their positions and how to involve them effectively in the programme (section 2.2.5);
  - identifying community perceptions – to assess the level of community understanding of the problem and support for interventions and to determine whether other programmes are being undertaken/have been undertaken from which lessons can be learned (section 2.2.6).
- **2.3 Choosing priority actions:** This section outlines a series of initiatives that have proven effective in reducing the incidence of drinking and driving in numerous countries, or are critical to the success and sustainability of an anti-drinking and driving programme. The initiatives are listed in terms of their priority (high, medium, low) for countries in the early stages of developing a programme to prevent drink-driving. Your choice of initiatives should be based on the outcome of the situation assessment (see section 2.2).

2.1 Why do you need to assess the situation before deciding which measures to take?

There are three main reasons to assess the situation before embarking on a programme to prevent crashes involving drinking and driving.

- To identify the magnitude of the problem and to provide evidence of why a programme aimed at preventing drink-driving crashes is necessary.
- To understand the current mechanisms in place, their strengths and weaknesses, and the effectiveness of any previously implemented solutions, particularly in terms of legislation and its enforcement.
- To provide baseline data that can be used to monitor progress once the programme is being implemented.

2.2 Collecting relevant data: where to begin

Assembling comprehensive road crash data of any kind can be difficult. Since political and administrative responsibilities differ from country to country, it is not possible to give a general prescription as to how to go about this task. In addition, (crash) under-reporting is commonplace in low-income countries *(1),* and even the information that is collected may not be analysed, reported or accurate. However, the following points probably have general validity and should be considered when trying to estimate the extent of road trauma involving drinking and driving.

The following entities generally collect and maintain road crash and road-crash injury data that could be helpful in gauging the extent and understanding the nature of the problem.

Police authorities: In most jurisdictions, investigating crashes is the responsibility of police. Since police are responsible for detecting breaches of traffic law, it is probable that police crash records would include details of any involved road user being affected by alcohol. In countries where breath or blood tests may not be regularly collected, the presence and role of alcohol can be subjective rather than objective.

Road authorities: Crash records may also be maintained by the road authority. However these records may not include comprehensive information about crashes. The primary interest of the road authorities is to identify shortcomings in the road system for which they have responsibility, so it is probable that alcohol involvement may well not be covered in the records they hold.

Health system: In some countries, the health system is the only comprehensive source of data about road crash injuries. In all but the most advanced countries, this is likely to be confined to admissions to the hospital system and therefore to take into account only the more serious injuries. Since the primary responsibility of the hospital is the care of injured people, details of the location of the crash, the events associated with it and the blood alcohol content (BAC) of the injured person may not be part of the records. For example, frequently, those admitted to hospital accident and emergency departments are simply recorded as having been involved in a road crash without being identified as a driver, passenger or pedestrian.

NOTE

Data collection through a sample survey, China

Official crash records in China show fewer than 4% of crashes involve alcohol. This very low proportion reflects the limited enforcement levels resulting from shortage of equipment and limited targeting of the problem.

In order to obtain another perspective, the Global Road Safety Partnership (GRSP), World Health Organization (WHO), the Ministry of Health and the traffic management bureau (traffic police) in Guangxi province are carrying out two surveys: random roadside breath tests in the cities of Nanning and Liuzhou, and blood tests of crash victims admitted to hospitals in the two cities. The goal is to obtain a wider picture of the involvement of alcohol in road injuries, in order to assist the police in targeting their resources more effectively.

Other potential sources of information on alcohol involvement in road crashes include employee and insurance records.

Even if comprehensive crash records can be assembled from one or more of the sources described above, the *extent* of alcohol involvement in crashes needs to be determined in order to make an overall assessment of the true scope of the problem. For example, references to alcohol presence may vary from *subjective* reports such as "alcohol consumed" or "drunk" to more *objective* breath or blood test scores.

Ideally, alcohol involvement in crashes should be based on *objective* breath or, where appropriate, blood testing of drivers at the roadside and/or of those injured at the hospital.

If the record of alcohol involvement is based on *subjective* opinion there is likely to be considerable underestimation of the problem because an investigating police officer or a medical practitioner is unlikely to consider a driver impaired until a relatively high BAC is reached.

2.2.1 Assessing road crash and health data

This assessment involves examining data on road crashes and injuries from, for example, the sources above in order to gauge the extent of the problem with regard to drinking and driving, and collecting information on injuries and fatalities resulting from crashes involving alcohol use.

Information will be needed on the incidence, severity and types of crashes, while a thorough understanding of the causes of crashes is also important. The data may also provide insight to drinking patterns and how to target interventions on those at greatest risk. Such information will be valuable for focusing the programme. For instance, it may turn out that busy urban roads are a high-risk area, or rural roads; young males may be the group found to be at greatest risk for drinking and driving.

If available crash data includes reliable information on BAC for a reasonable proportion of the drivers and riders involved in crashes, then assessing overall alcohol involvement is a relatively straightforward process. Should information on BAC levels not be available, another alternative is to conduct cross tabulations using existing crash data. Cross-tabulations that include location, month, day of week, time of day, speed limit and road class can be used to build a picture of where and when crashes occur. Cross-tabulating alcohol involvement by age, gender and type of vehicle can be expected to give guidance about which drivers to target in publicity and education campaigns.

NOTE

High-alcohol times, Australia

In Australia, researchers established alcohol hours on the basis of roadside breath alcohol surveys *(6)*. The percentage of drivers with a BAC greater than 0.05 varied throughout the day as follows:

- less than 1% between 0900 and 1500 hrs
- 2–4% between 1500 and 2100 hrs
- 12–16% between 2100 and 0300 hrs
- 3–7% between 0300 and 0900 hrs.

The higher percentages in each period were found on Thursdays, Fridays and Saturdays.

Table 2.1 provides a guide to assessing road crash data.

Table 2.1 Road crash data assessment

	Question	YES	NO	DATA/EXAMPLE
1.	How many injuries and deaths occur as a result of road traffic crashes in the project region? (Note that it is important for the working group to predefine the project unit or region of assessment – see Module 3. For example, this may be the entire country, or it may be a particular province/state, or town or community.)			e.g. from police records, hospital records
2.	Is data available on road crashes involving alcohol that can be analysed? (If not, see 2.2.1 for ways to determine the involvement of alcohol in road crashes.)			e.g. from police test records, hospital blood tests
3.	What is the scale of the problem of alcohol related crashes in terms of the number of crashes and the number of fatalities? What proportion of all road traffic crashes does this comprise?			e.g. from police records, hospital records
4.	Does the data provide detailed information on where and when the crashes occur and who is involved?			e.g. police records of crash locations
5.	Who are those most likely to be involved in crashes involving alcohol?			e.g. police crash records, hospital records, surveys of alcohol users
6.	Are the primary risk factors known? (Example risk factors may include age, gender, time of day, prior history of drinking and driving.)			e.g. studies on drinking patterns within society
7.	Are hospitals equipped and legally allowed to take blood samples?			
8.	Are police trained and equipped for on-road enforcement of drinking and driving laws?			

Source: *(12)*

2.2.2 What laws exist?

Many countries have laws on drinking and driving. Understanding what laws exist and whether they are adequately enforced is a critical part of understanding the situation and identifying priority actions. It is therefore useful to begin by reviewing the current state of the laws, as in Table 2.2.

Table 2.2 Assessment of laws

	Question	YES	NO	SPECIFY
1.	Are there laws relating to road safety in general?			
2.	Is "drunk driving" illegal? If so, is "drunk" defined? (The answer generally will be yes but "drunk" is not always clearly defined, for example as a BAC level.)			
3.	Is there a law on BAC and/or a BrAC? Are there different BAC levels for different driver groups? (E.g. lower BAC levels for novice and commercial drivers.)			
4.	What evidence is needed by the courts in order to convict an offender?			
5.	Can police or other traffic enforcement officers require that a driver provide a breath test (or other evidence of sobriety) at any time without having to wait for the driver to make a mistake before pulling him or her over? (E.g. at sobriety checkpoints or random breath testing.)			
6.	Are all those involved in a crash tested for blood alcohol or breath as a matter of routine?			
7.	Is the judicial system equipped to support drink-driving legislation?			
8.	Do judges have discretion in imposing lighter penalties than those recommended or prescribed in legislation?			
9.	Is there compliance with existing laws? (See section 2.2.3)			
10.	Is the public aware of existing laws on drinking and driving? (See section 2.2.4)			

To understand the fuller context in which drinking and driving takes place, it is also worth considering:

- laws pertaining to what constitutes "evidence" of a particular BAC/BrAC level;
- laws governing the sale of alcohol – what sort of establishment, opening hours, laws and practices relating to the responsible serving of alcohol;
- legal drinking age and how this relates to the driver licensing age.

Sample legislation from diverse countries is provided in Module 3, section 3.3.

2.2.3 Is there compliance with existing laws?

Experience has shown that road safety legislation without proper enforcement is unlikely to have the desired effect. In part, this is because road users do not always recognize the risks involved and the benefits to them of the protective measures contained in the legislation. For this reason, they do not always comply with laws designed to improve their own safety on the roads.

It is important to know the extent to which existing laws are being complied with and, if compliance is low, why this is.

BOX 2.1: **Factors compromising compliance with laws, British Columbia, Canada**

In 2003, the Government of British Columbia, Canada, commissioned a discussion paper on *Drinking and Driving Issues and Strategies in British Columbia (3)*. An outcome of research conducted for the paper was an understanding of factors that may be detracting from compliance with drinking and driving laws.

These factors included:

- Drivers are unaware of the consequences of drinking and driving.
  - 44% could not identify a single administrative sanction that a driver faces for driving with BAC over 0.08 g/ml or refusing a breath test.
- Low risk of a drink-driver being stopped.
  - The number of impaired driving charges recommended by police decreased by 20% (from 8738 to 6932).
- Low risk of being charged if stopped.
  - Officers surveyed suggested that police are more reluctant to proceed with or recommend the more severe criminal charges for a number of reasons:
    - the time it takes to process the charge (62%)
    - insufficient staff to process the impaired driver (49%)
    - drivers unlikely to be found guilty of the charge (40%)
    - drivers likely to plead to a lesser or included offence (36%).
- Slow nature of criminal cases, and uncertainty of conviction.
  - Although the provincial suspensions for criminal drinking and driving convictions are severe, their deterrent effect as was found to be compromised by lack of "swiftness" and "certainty". Drinking and driving charges are far more likely than other criminal provincial court matters to need a trial to reach resolution, a process that was found to take up to 18 months to complete.
- No compulsory treatment countermeasures for problem drinkers.
  - 25% of British Columbia's fatally injured drivers in 2002 had BACs in excess of 1.5 g/ml. However, British Columbia lacked a compulsory rehabilitation programme for drinking drivers.

A variety of statistics and measures can also be used as a guide for determining compliance with drinking and driving laws, including:

Percentage of drivers and riders killed with a BAC over the legal limit

In some countries, this information is routinely available, although coverage is rarely complete. Coverage of drivers and riders killed is generally easier and therefore much better than coverage of drivers and riders injured. Even if there is a legal requirement that blood samples are taken on admission to hospital, the pressure of work in emergency departments often means that this is not done.

Number of alcohol offences detected

This measure can give reasonably complete numbers of driving offences involving alcohol impairment over time, but it is dependent on the extent of police effort put into alcohol enforcement and so may not provide a true reflection of the actual situation.

Percentage of drivers stopped with a BAC over the legal limit

This can be a useful measure, particularly where sobriety checkpoints (where drivers are "pulled over" in order for a measure of their BAC to be taken) are in use and large numbers of drivers are tested. However, the proportion of drivers encountered with a BAC over the legal limit can be expected to fluctuate depending on where and when enforcement operations are carried out. This measure should therefore be treated with caution when assessing individual operations, or operations over a short period. If the intensity, timing and type of location for operations are stable over the long term, then it can be a useful measure.

Driver surveys

The best way to assess levels of drinking and driving and trends is to conduct independent surveys where researchers stop vehicles, or approach vehicles stopped at lights, and request breath samples. Care must be taken in deciding which times of day and which locations to use to ensure that the breath sample is representative of driving over the time period and road network for which the information is required. Another effective measure is to work closely with police and ask them to conduct a breath-test on all drivers involved in crashes (if they have ready access to breathalysers). In some countries this is required by law. In Module 3 the process for conducting such a survey is described.

BOX 2.2: **Drinking and driving in an urban setting, Kenya**

In Kenya, alcohol is believed to contribute to the growing problem of road crashes in the country. However, the proportion of drivers who consume alcohol before driving is not routinely collected in road crash statistics. A study was undertaken to objectively establish levels of BAC in the general driving population, and to identify the proportion and travel characteristics of drivers who consumed alcohol, including information on their BAC levels by age, sex and occupation. The findings were used as the basis for setting an appropriate legal limit for drivers, and to promote measures to deter drinking and driving.

Methods

A roadside survey of drivers was conduced in Eldoret town in western Kenya over a period of seven consecutive days in 1995, between 7pm and 12 midnight. Seven locations on all major roads passing through the town and those leading to the main residential areas were selected as sampling sites. Drivers were selected at random at each location and all motor vehicles were eligible for inclusion.

The research team was made up of a primary investigator and four medical students working in full cooperation with the traffic police, who stopped vehicles as well as maintaining orderly traffic flow and security. The police stopped vehicles and after conducting a routine traffic check, asked he driver for his or her consent to be interviewed by the research team. Interviewers approached the consenting drivers (while the police withdrew), introduced themselves then conducted a short interview to find out the driver's age, occupation, origin and destination of the journey and whether the driver had taken a drink in the previous six hours. The driver was then asked to take a breath test.

Selected results

90% of the drivers agreed to the breath test. Of these, 19.9% had a BAC under 0.05, 8.4% had BACs greater than 0.05 and 4% exceeded 0.08. A greater proportion of males had been drinking (20%) in comparison to females (12.5%). All drivers with BACs over 0.05 were male.

BOX 2.3: **Random breath testing (RBT), Australia**

The potential value of the types of data described above is demonstrated by a programme of sampling carried out in the Adelaide metropolitan area, South Australia, between 1979 and 1992. Random breath testing was introduced in South Australia in 1981, following a period of public controversy. However, after RBT was introduced, the number of alcohol related road crashes was substantially reduced.

Roadside surveys (conducted by research assistants who breath-tested the first driver stopped at each red light cycle) revealed a substantial drop in the number of drivers with a BAC exceeding the legal limit of 0.08, from 12% to 4%.

The early style of RBT made it relatively easy for drivers to avoid being stopped and tested by using backstreets to circumnavigate testing stations, as was confirmed by observational studies. The investigation of locations where crashes involving drink-driving frequently occurred suggested a move away from the major arterials would be better.

This demonstrates how roadside surveys, observational studies and crash analysis can provide insights which would not be available from a consideration of the operational statistics alone, and that these methods can help to ensure enforcement programmes are appropriately targeted, especially during the early years of a comprehensive alcohol programme.

2.2.4 What does the public know about the existing laws?

The driving population's knowledge of laws can be assessed through focus group discussions, face to face or telephone interviews. For countries with a reasonable degree of literacy and access to the internet, e-mail questionnaires directed to individuals – or web-based questionnaires – are also possibilities. Although this is only a small proportion of the population at present, it is expected to grow rapidly, especially among younger people who are likely to be at risk of drinking and driving.

When assessing community knowledge in relation to drinking and driving legislation and enforcement, as well as the risks involved in drinking and driving, it is particularly important to find out:

- how well people understand the basis of the law, e.g. the BAC limit (where one applies), or the definition of impaired driving where there is no set limit;
- how well people understand how alcohol impairs judgement and the ability to drive a motor vehicle safely;
- how well people understand the relationship between drinking and the BAC limit, or the definition of impaired driving, as appropriate;
- people's estimate of the probability of being detected if driving while impaired by alcohol;
- how well people understand the punishments if convicted for drinking and driving, including fines and disqualification, and the likely impact on their livelihood and social life.

The information gathered through a survey such as that outlined in Table 2.3, combined with information on the respondent (e.g. age group, gender), can help identify target groups of individuals who may drink and drive. This in turn is useful in planning a drinking and driving programme, and knowing which high risk behaviour and segment of the population to focus on.

2.2.5 What is a stakeholder assessment and why is it necessary?

A stakeholder assessment sheds light on the social environment in which a programme on drinking and driving will be developed and implemented.

The key objectives of a stakeholder analysis are:

1. to identify key stakeholders, define their characteristics and examine how they will be affected by the policy (e.g. their specific interests, likely expectations in terms of benefits, changes and adverse outcomes);
2. to assess their potential influence on the development, approval and implementation of a programme or legislation on drinking and driving;
3. to understand the relationship between stakeholders and possible conflicts of interest that may arise;
4. to assess the capacity of different stakeholders to participate in developing a programme and the likelihood of their contributing to the process;

5. to decide how they should be involved in the process to ensure the best possible quality and viability of the programme, in particular:
   - the nature of their participation (e.g. advisers, consultants or collaborating partners)
   - the form of their participation (e.g. working group members, advisers or sponsors)
   - the mode of their participation (e.g. individual participants or group representatives).

Table 2.3 Sample community survey on drinking and driving

	Question	Possible responses
1.	Do you know the BAC limit in your country? (If yes, check BAC value is correct.) Alternatively, if there is no BAC limit, the question could be: "Do you know the legal definition for impaired driving in your country?"	1 yes (with correct or incorrect value) 2 no 3 don't know what BAC is
2.	In your opinion, is operating a motor vehicle after consuming alcohol dangerous?	1 yes 2 no 3 don't know/unsure
3.	In your opinion, does the consumption of alcohol before operating a motor vehicle increase the risk of causing a road crash?	1 yes 2 no 3 don't know/unsure
4.	Have you consumed alcohol before operating a motor vehicle?	1 regularly 2 occasionally 3 no 4 don't know/unsure
5.	Have you travelled as a passenger in a motor vehicle with someone who has consumed alcohol before driving?	1 regularly 2 occasionally 3 no 4 don't know/unsure
6.	In your opinion, what is the likelihood of being stopped by the traffic police on suspicion of drinking and driving?	1 high 2 moderate 3 low 4 don't know/unsure

Key stakeholders can include:

- government departments
- senior health department officials
- surgeons and influential medics
- non-government organizations with a focus on community health perspectives
- employers
- local communities
- individuals (e.g. representatives of work forces, victims of drinking and driving crashes).

Additionally, there will be stakeholders, sometimes representing the voices of those opposed to the intervention, which have a strong interest in the activity, including:

- owners of licensed premises and retailers of alcohol
- manufacturers of alcoholic beverages
- manufacturers of alcohol-testing equipment
- motor vehicle manufacturers.

Experience has shown that involving members of a wide variety of groups, representing diverse interests, in discussions about the project is important as well. Such an approach can often overcome initial concerns and opposition before reaching the public sphere.

The second important function of the analysis is to understand the interest each of the stakeholders might have in the project. A careful analysis should be made of the position of all major stakeholders, as this will help in designing appropriate approaches for involving them. It is especially important to identify supporters and opponents and, moreover, to appreciate the reasons for their respective positions, so as to be able to develop a marketable package that satisfies all concerned parties.

Stakeholders can have:

- **Operational interest in the issue of drinking and driving.**

  These include police, road authorities, community road safety agencies and safety research organizations. These organizations usually have crucial operational roles in road safety in general, and a vested and substantial interest in reducing the number of traffic crashes involving alcohol. They should be involved in any programme related to alcohol-impaired driving.

- **Professional and social interest in the issue of drinking and driving.**

  The medical profession, emergency services groups (e.g. crash recovery, ambulance), community care organizations, citizen advocacy groups, social workers, alcohol rehabilitation service providers and educators are examples of those with a fundamentally professional or social development interest in the issue of drinking and driving.

Generally these groups are very interested in the scale and effectiveness of what is planned. Some of these organizations can be very influential in society and this influence can be tapped by planning a range of activities which they can undertake within the scope of their day-to-day activities. Examples might include, information on drinking and driving handed out by doctors at clinics, educational materials used by teachers with young pre-drivers in their classrooms, information on how to deal with excessive alcohol consumption (amongst partners and other family members) provided by social workers.

- **Financial interest in the issue of drinking and driving.**

  This group includes owners of licensed premises, events organizers, alcohol manufacturers, and the breath testing equipment industry. Motor vehicle and alcohol beverage manufacturers may also have a financial interest if any countermeasure initiatives are planned which could change the price and appeal of vehicles and alcohol beverages to consumers. Many examples exist where support for responsible alcohol consumption and activities supporting anti-drinking and driving campaigns have been undertaken or funded by the beverage alcohol industry.

Entrenched behaviour is difficult to address and requires a long and sustained approach for success to be achieved. There will be opposition in all communities to the change being promoted and sometimes those in opposition have considerable power and influence.

Consequently there is a need to establish strong partners and influential groups in the community who are prepared to support the intervention and engage in community debate with those who oppose the activity. These stakeholders need to be contacted in the early development of an intervention and be kept informed about the progress of the activity, changes in community views and the nature of opposing arguments which are generated in the media and placed before the public.

In some countries a separate authority may be responsible for public safety publicity.

The road safety agency also needs to consider the potential role of other organizations that may have special roles to play in the programme. These can include many of the financial and social interest stakeholders identified in section 2.2.5 and Table 2.4. Two types of organization that should be considered for special attention are insurance companies and hospitals.

Table 2.4 **Potential roles and responsibilities for stakeholders involved in anti-drinking and driving programmes**

Authority	Major role and responsibility
Road safety authority	Legislation Funding Programme coordination, strategy, monitoring and reporting Major publicity campaigns
Police	Enforcement of drinking and driving laws Public commentary Participant in community education activities
Hospitals/Health Authorities	Political lobbying in support of interventions Community leadership in discussion and debates Highlighting health benefits from effective programmes
Insurance companies	Support for funding interventions from profits generated by effective road safety interventions Risk based premiums policy
Education department	Alcohol and its influences included in school programmes
Community road safety groups	Community education activity Localisation of major publicity campaigns
Citizen advocacy groups	Promoting community-driven initiatives
Producers, distributors and retailers	Responsible marketing in the context of road safety Server training and programme sponsorship On-premise education and awareness campaigns
Road safety research authority	Problem identification Programme evaluation
Road authority	Road engineering treatments Vehicle speed and traffic management policies
Employer	Company policies regarding drinking and driving Employee education regarding drinking and driving Driver training Fleet safety management policies
Media	Communicating to the public about the drinking and driving situation in the country, and risks of consuming alcohol and driving Communicating about a national programme or campaign on drinking and driving
Beverage alcohol licensing authority	Licensed premises supervision Responsible alcohol-serving policies and training

NOTE

Insurance

For those insurance companies that insure against injury resulting from a road crash the major component of their costs is insurance claims payments for compensation and injury rehabilitation.

A high quality drinking and driving program that reduces the incidence of alcohol-impaired driving will result in substantially lower claim costs for the insurance company. An excellent example is that of the Transport Accident Commission in Victoria, Australia, which reported a 20% decline in injury claims between 1999 and 2004, largely attributed to road safety programs.

Insurance companies are direct beneficiaries of effective road safety programs. In most jurisdictions where this is understood, insurance companies provide financial assistance for drinking and driving interventions

NOTE

Health sector

The health sector is also a beneficiary of effective anti-drinking and driving programmes. The major benefit derived by this sector is a reduced demand from road crash victims for hospital beds and access to emergency equipment and staff. This leaves facilities available for other patients and increases the scope of emergency medical services available to the community. This means that the health ministry or authority needs to be involved and constantly apply pressure on other agencies to keep road safety high on the political agenda.

In addition, senior health sector representatives often have substantial standing within the community – seeking their assistance in supporting major components of a programme, such as legislation for legal BAC limits, or powers for police to participate in random roadside checking of drivers, can be an important for the success of a programme.

2.2.6 How to identify community perceptions

Alcohol consumption is a part of life and social customs in many communities worldwide. Thus it is important to understand drinking patterns and the role of alcohol in society, local opinions in relation to road safety and attitudes towards drinking and driving. This information can help shape a programme on drinking and driving, and decide how much should be invested in raising public awareness about the risks associated with it.

Specifically, a community assessment could address the questions in Table 2.5.

Table 2.5 Community assessment

	Question	YES	NO	SPECIFY
1.	Does the community view drink-driving as a problem?			
2.	Will community representatives support or oppose the intervention? (The answer might be found after your stakeholder assessment.)			
3.	Are there ways of building community support for an anti-drinking and driving programme?			
4.	Are there key community stakeholders who would want to assist?			

Where will this data come from?

Data of this type may have been collected as part of an earlier programme. There may also be studies conducted by market research firms, universities, non-governmental organizations or other agencies working in road safety.

If such data is not available, it might be useful to conduct a public opinion survey to collect it. If the programme is still being developed, there are likely to be time and budget constraints. Therefore, only a preliminary survey is suggested at this stage, and a more detailed one can be undertaken later. In a preliminary survey, it is most useful to focus just on the geographic area and population groups estimated to have the highest risks.

2.2.7 What other factors should be addressed as part of the situation assessment?

As a part of the general situation assessment, it is critical to look at other factors that could influence the type and scope of programme implementation, including operational, financial, and political issues.

Additional questions that should be addressed as part of the general assessment include:

Operational issues

- Are there agencies that are enthusiastic about the intervention and could act as "champions" (maybe answered as part of the stakeholder or community assessment)?
- Can the intervention be mounted with some agencies not involved initially?
- Does the intervention require special training or equipment? Are these items available? What training needs are there?
- Does an intervention rely on new laws? If so what lead times are required to prepare?
- Do the police have the capacity to enforce a new law?
- Are key agencies prepared to coordinate their efforts?

Financial issues

- What are the costs involved in financing an initiative? (See Module 3, section 3.2.8 for ideas regarding the components of a possible programme, or for which budgets would need to be identified).
- What sources of funds are available for financing an initiative?
- Is the scale of funding required for the intervention likely to be available? If not, is there potential for a prior activity designed to generate funding?
- Can a pilot be mounted with available funds to show effectiveness?

Political issues

- Are politicians aware of the problem?
- Is there a need to sensitise them to the issues?
- Will the intervention create community opposition? If so, how can this be addressed?
- Are there political benefits which can be provided through the programme?

2.3 Choosing priority actions

The above section provided information on conducting important assessments and reviewing critical issues to gain a better understanding of how a range of authorities and individual organizations might contribute to a successful intervention on drink-driving. In many countries, however, the circumstances may not be conducive to establishing a multi-faceted programme as a first step.

The key issue to be highlighted in this section is to choose actions and design an intervention which is feasible in the circumstances facing the authorities in each country *and not to wait until the situation exists where the ideal programme can be commenced.* While this approach to selection of solutions is recommended, there are some key factors noted in Module 1 which are essential if a programme is to be effective, including:

- strong political commitment to prevent drinking and driving;
- legislation that clearly defines illegal (for driving) levels of BAC and penalties for drinking and driving offences;
- strong and well-publicised enforcement campaigns;
- public education, to change attitudes to drinking and driving;
- strict penalties for those caught breaking the law.

2.3.1 Possible programme elements

Table 2.6 presents a number of elements that could be included in a national or regional programme to prevent crashes involving drinking and driving in your community. They can also contribute to the overall effectiveness and sustainability of a programme.

The elements are presented in terms of their level of priority, with high priority indicating that this particular element is essential to any programme to prevent drinking and driving. In addition, assessments are made on the effectiveness of each element in terms of reducing road crashes involving alcohol; this is based on experience and research, the level of difficulty in implementation and the cost to implement. There is also a guide to where more information can be found on each element in this manual.

Summary

- It is critical to have a comprehensive understanding of the drinking and driving problem in your country or region in order to design a relevant and effective programme.
- In order to develop an understanding of the drinking and driving problem, a situation analysis should be undertaken that examines:
  - crash and health data on road traffic incidents involving alcohol;
  - laws pertaining to drinking and driving such as maximum BAC/BrAC levels for motorists, how these laws are enforced, and why compliance with laws may be low;
  - relevant stakeholders and their potential role in a programme aimed at deterring drinking and driving;
  - drinking patterns and community perceptions of drinking and driving.
- Projects aimed at reducing road crashes involving drinking and driving require high-level support which must be garnered from many different agencies.
- Interventions chosen should be relevant to the country's specific drinking and driving situation.
- There are a few key factors, which are essential for any anti-drinking and driving programme to be successful. These are:
  - Assess available data to identify target groups.
  - Ensure laws on drinking and driving are clear and enforceable.
  - Enforce the laws fairly and firmly, with appropriate punishments.
  - Ensure that public information supports the law and its enforcement.
  - Monitor and evaluate the programme.

Table 2.6 Possible programme elements by priority for countries implementing a first-generation programme to reduce drinking and driving

	Element	Description	Research	Effectiveness	Difficulty to undertake	Cost to implement	Section in this manual
High Priority	Road safety/ crash data assessment	Without this, any expenditure of funds and effort could be wasted by underestimating the scale of the problem, or by tackling a problem which is too hard to address in the current circumstances.	yes	high	low	low	2.2
	Laws on BAC or BrAC levels	An enforceable law is a pre-condition for effective enforcement by the police. While some jurisdictions have had success with sobriety testing methods, in general the existence of a specific law defining BAC levels provides the base conditions usually required by police in order to generate the high levels of enforcement required to influence drivers.	yes	high	Low if there is political commitment	low	3.3.1
	Strong enforcement of drink-driving laws	Undertaking sufficient enforcement measures such as sobriety checkpoints and random breath testing to influence drivers' views on the likelihood of apprehension is a key element. Experience shows that behaviour will not be changed by encouragement or education alone. Enforcement of laws by the police is critical to reinforce public education aimed at preventing drinking and driving in the first place.	yes	high	Low if there is political commitment	medium	3.3.2
	Strict and swift punishment for those who break drinking and driving laws	Penalties considered serious by the general public and which are applied swiftly by the authorities can effectively deter individuals from drinking and driving. Examples include fines, driver licence suspension, imprisonment and vehicle sanctions.	yes	high	Low if there is political commitment	low	3.3.3
	Public information and education	These should be linked to other elements of the programme (enforcement, legal limit etc). Education is the supportive element rather than the central one. However some educational elements are required to commence the process of changing attitudes while behaviour is being addressed during the programme.	some	High when combined with enforcement	medium	medium to high	3.4
	Monitoring and evaluation	If a programme is not measured and the desired objectives are not monitored then any success will not be known. Monitoring will also identify the need for amendments to the programme during operation. Monitoring and evaluation data also helps reinforce community and political support, and encourages the activities of agency staff involved in the project activities.	yes	high	low	low	4.1
	Lower BAC for driver groups such as bus drivers or young drivers	Making the legal level of blood alcohol lower or zero tolerance for specific groups – such as those with responsibilities for passengers or dangerous cargo, and high risk groups such as young drivers.	yes	high	Low if there is political commitment	low	3.1.1

	Element	Description	Research	Effectiveness	Difficulty to undertake	Cost to implement	Section in this manual
Medium Priority	Laws prohibiting alcohol sales at certain locations and times	Intended to make access to alcohol more difficult for drivers.	yes	medium	low	low	3.1.1
	Initiatives to control alcohol access and distribution	Regulations that require licensing alcohol sale and distribution to help address the problem of drinking and driving. Most alcohol licensing regulation is meant to protect individuals and segments of the population (e.g. under legal drinking/purchasing age) as well as society at large from alcohol-related harm.	yes	medium	low	medium	3.1.1
	Graduated licensing for novice drivers	Graduated licensing programmes control the rate and manner in which young drivers gain access to full driving privileges. They may include delayed access to a full licence and curfews, as well as lower BAC limits for novice drivers.	some	medium to high	low	Low if there is political commitment	3.3.1
	Employer programmes	These aim to use employers' relationships with and responsibilities towards staff to influence or control drinking and driving. Can be effective in large fleet operations.	some	medium	low	medium	3.5
	Vehicle sanctions	Vehicle sanctions such as vehicle impoundment, vehicle licence plate impoundment, vehicle registration cancellation and vehicle immobilization have been used effectively in reducing repeat drinking and driving. In order for a programme to be effective, countries must have a good vehicle registration system.	some	medium	low	Medium, if there is political commitment	3.3.3
Low Priority	Designated "driver and ride" service programmes	These strategies aim provide safe transport following a drinking event. Designated driver programmes encourage one person in a group to abstain from drinking and provide safe transport for the others. Ride service programmes provide transportation to intoxicated people who would otherwise drive.	little	low	low	low	3.5
	Treatment for repeat offenders	Treatment rehabilitation programmes are part of drink-driving countermeasures in many countries. The programmes are diverse and range in effectiveness, which is often unknown. In order for treatment programmes to be seriously considered, countries must have sufficient information on repeat drinking and driving offenders.	some	low to medium	medium	low to medium	3.3.3
	School education programmes	Introduce education in schools about the dangers of drinking and driving. This can include visits to schools by representatives of the health sector or traffic police, particularly if specific materials are not available.	some	low	low	low	3.4.1

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3

How to design and implement a drinking and driving programme

How to design and implement a drinking and driving programme

THE PREVIOUS MODULE described how to assess the drinking and driving situation in a country or region. This module describes how to use this information to design and implement a targeted programme to reduce the incidence of drinking and driving. It includes not only technical information but also the practical information needed to ensure that implementation is smooth.

A national or regional programme to reduce the number of road crashes involving alcohol is a long-term commitment. It will have a long-term objective, such as reducing the number of road crashes involving drinking and driving by a certain percentage within a specific time period. It will also contain a number of specific components that will help "deliver" the programme objective. A number of possible components of a national or regional drinking and driving programme are included in this module, such as implementing or strengthening legislation, the enforcement of drinking and driving laws, punishments and sanctions for offenders, and targeted public information campaigns and community programmes.

While all countries differ in terms of culture, the role of alcohol in society, industrialisation, motorization and existing road safety problems, there are a number of underlying "rules" and principles that apply to any road safety intervention programme. This module is not prescriptive in terms of the order in which the described elements are followed.

The sections in this module provide guidance on the following issues:

- **3.1 Gaining political and community support for a drinking and driving programme:** The dedicated support of key political community leaders for a drinking and driving programme is critical for the programme's success. This section provides guidance on a variety of steps that can be helpful in gaining the support needed, such as establishing a working group.
- **3.2 How to prepare a plan of action:** This section describes the necessary steps to form an action plan for the development and implementation of a drinking and driving programme. These steps include: identifying the problem, setting objectives and targets, deciding on activities and piloting the programme, setting a timeframe, estimating resources and monitoring the programme. Figure 3.2 provides an overview of the steps in this process, and where more detail can be found on them in this manual.
- **3.3 Interventions:** In this core section of the manual, guidance is provided on a range of interventions that can be included in a drinking and driving programme. Some of these interventions are recommended as "high priority" based on research and their proven effectiveness in reducing the incidence of drinking and driving in particular countries. Table 2.6 in module 2 provides an overview of initiatives considered as high, medium or low priority for countries in the initial stages of developing a drinking and driving programme. Interventions discussed in this manual include laws (and setting blood alcohol content (BAC) limits), enforcement of these laws, publicity campaigns and community programmes.

- **3.4 Social marketing and public education:** This section shows how mass media campaigns can increase public knowledge about legislation and raise awareness of increased enforcement. The objectives and target group of such a mass media campaign should be clearly identified, and advertising and public relations specialists should be employed to create targeted campaign messages and materials. The effects of the mass media element of the drinking and driving campaign on the opinions and behaviour of road users should be closely monitored and evaluated, and lessons learned should be used to improve the quality and impact of future campaigns.
- **3.5 Community-based interventions:** Drinking and driving interventions undertaken by and involving the local community can be effective in educating the public about the risks involved in drinking and driving, and preventing it from taking place. This section highlights the interventions of voluntary organizations created specifically to prevent drinking and driving, to programmes undertaken by employers, schools, outlets selling alcohol, and designated-driver programmes.
- **3.6 Engineering interventions:** This section looks at the benefits of engineering interventions to prevent crashes involving drinking and driving. These include reducing roadside hazards for drivers and pedestrians, lower speed limits, better lighting, "refuge islands" to allow staged road crossing, and improved pedestrian signals at traffic lights.
- **3.7 Ensuring an appropriate medical response:** In planning a drinking and driving programme it is also important to consider the ability to respond to crashes that involve victims who are impaired by alcohol. This means taking into consideration the capacity to provide an appropriate first aid response and addressing existing pre-hospital care and trauma care systems.

BOX 3.1: **The Polish national road safety programme (GAMBIT 2005)**

1. Revise laws on drinking and driving:
- to modify drink-driving and drug-driving laws.

2. Improve public education and communications to raise awareness of the role of alcohol in crashes:
- to nurture, through school education, negative attitudes to driving while under the influence of alcohol or similar substances;
- to make "sober driving" part of driver training;
- to introduce systematic drink-drive campaigns.

3. Improve enforcement of drinking and driving laws:
- to provide road traffic enforcement services with devices for recording and testing drivers for alcohol and other substances;
- to improve random driver-sobriety checks as a standard test procedure;
- to introduce random checks on drivers for substances other than alcohol;
- to promote vehicle devices that record and test drivers after they have been drinking.

4. Conduct systematic studies of road use while under the influence of alcohol or other substances:
- to develop a system for monitoring the problem of drivers using roads under the influence of alcohol or other substances;
- to study the effectiveness of schemes designed to reduce the number of road users under the influence of alcohol.

Source: *Polish National Road Safety Council*

3.1 Gaining political and community support for a drinking and driving programme

The development and success of any drinking and driving programme will depend greatly on winning the dedicated support of politicians, high-level community decision-makers and the community itself.

After having produced evidence that drinking and driving is a problem in the country or region, support from politicians and decision-makers for the development or strengthening of a drinking and driving programme must be obtained. Establishing a pro-active drinking and driving working group of key stakeholders can be an effective way to gain such support, and develop and implement a comprehensive drinking and driving programme.

3.1.1 How to establish and coordinate a working group

A programme to prevent drinking and driving should ideally be developed and coordinated by the country or regional road safety unit in cooperation with a working group of key stakeholders. Members of the working group should be identified via the stakeholder analysis (see Module 2). If a road safety unit does not exist, a specific working group should be established to develop and coordinate the implementation of the programme.

The working group could draw on the expertise and experiences of a range of individuals, including:

- the lead agency given the task of improving road safety in the country;
- relevant government departments (transport, health, police, licensing authorities, education);
- public health and injury prevention specialists;
- health care professionals;
- independent researchers in the field;
- non-government organizations, including those representing victims of road crashes, where these exist;
- road user organizations (transport operators, motoring and motorcycle associations);
- large employers and fleet operators;
- suppliers and retailers of alcohol.

Ideally, the working group should also engage critics of a drinking and driving programme. Their position needs to be understood as well, so that a programme is devised that addresses possible objections and is acceptable to as many parts of society as possible.

Throughout the programme it is important that all stakeholders are aware of:

- why the intervention is necessary;
- why they are part of the programme;
- their role in the programme;
- what interventions have already been undertaken (by others), are currently in operation or are planned to reduce drinking and driving;
- the long-term objectives of the programme;
- successes (and failures).

BOX 3.2: **Developing a publicity campaign involving stakeholders, Thailand**

In 1996 and 1997, a Road Safety Master Plan and Action Plan were compiled for Thailand. In implementing the plan, the Ministry of Transport and Communications commissioned local and overseas consultants to conduct pilot projects, including a public education campaign, in Nakhon Pathom and Phuket provinces. The main objectives of the public education campaigns were to minimise the harm caused by road users' attitudes to drinking and driving, which frequently resulted in crashes.

To create a common understanding and gain participation at national and provincial levels, a national committee was established. Sub-committees representing ministers, provincial interests and the transport sector formed the basis for co-ordinated project work.

Much effort was required in the early stages at the provincial level to explain why a public information and education campaign was necessary *(1),* because many saw law enforcement as the best way to reduce drinking and driving. But when province representatives understood how crucial public information campaigns are in changing behaviour and reducing crashes, they agreed to design an information campaign for their provinces.

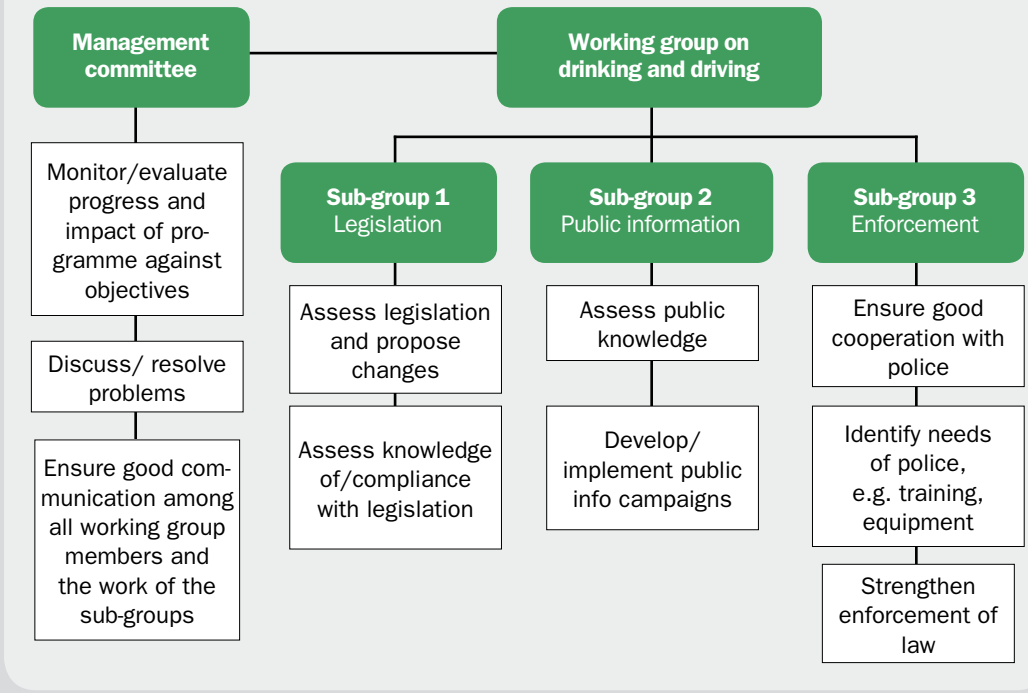
Assigning roles to working group members

The group should set clear objectives and have sufficient authority and resources to ensure the programme is carried out effectively. In addition, the roles and responsibilities of each of the members of the working group should be clear; they should have access to outside expertise, and good lines of communication to the many organizations whose cooperation is necessary to ensure the programme's success.

The group's overall role should be to develop, initiate and manage a drinking and driving programme which embraces assessment of the problem, monitoring the programme, prevention, education, enforcement, punishment, possibly rehabilitation of repeat offenders, and finally evaluating the programme's effect. One way to achieve this is to delegate tasks to sub-groups, at least until the programme is well established as a part of the country or region's road safety strategy. After that point, it may be more effective to re-convene sub-groups on a needs basis as issues arise in the delivery of the programme (see figure 3.1).

As the working group may be made up of a number of diverse stakeholders, a small management committee may be established in order to discuss problems emanating from each area of responsibility. Fine-tuning of project activities can be discussed and agreed at these meetings, and unforeseen problems and action to resolve them may also be raised. The management committee should meet frequently.

Figure 3.1 Example organizational structure of working group and some possible tasks



Certain functions will be common to all well-organized drinking and driving programmes. These include the initiation of the programme – its conceptualization and launch, the operation itself, its coordination and the function of advocacy. Those who are specifically assigned to these functions are described here because of their special roles. Sometimes, one person or agency may fulfil more than one function.

The initiator

The person or agency initiating the activity does not need to be engaged in the same way as other involved parties. However, they must fit into the operation to ensure that the programme moves forward in a coordinated manner. Their enthusiasm should be harnessed for the benefit of the programme.

Operators

These are the people with the technical responsibility for carrying out various aspects of the programme. Frequently, they will be officials of the lead and subsidiary agencies involved – such as the department of transport, the ministry or department of legal affairs, and the police. They must be allowed to participate fully. For this reason, their regular work duties may have to be expanded to take in additional tasks created by the drinking and driving programme. Training and other resources may also be required here.

Operators need to be open to input from others involved in the programme. They should not be discouraging or dismissive of non-technical people, as can be the case with technical experts.

The coordinator

This person has overall responsibility for the execution of the programme and their role is critical to its success. The coordinator, whether paid or not, should have clearly defined responsibilities. These include overseeing the activities of the working groups, monitoring progress, and ensuring that all those involved, including the initiator and operators, are kept well informed. The coordinator should have full authority to carry out these functions, as well as the resources and the support needed to implement these tasks. For this reason, the role is best filled by someone whose work already includes some of these responsibilities. Such a person may be the chief technical officer within the transport department, the person in charge of the traffic police, or a high-ranking official in the health ministry.

The advocate(s)

The advocate champions the battle against drinking and driving. This is usually one or several well known, influential and respected people with good communications skills. The advocate and coordinator can have several qualities and tasks in common, and in some instances, they are the same person. Prominent people who have themselves been affected – generally adversely – by drunk driving, usually make good advocates.

Advisory group

In many circumstances the working group may be supported by an advisory group of other interested stakeholders. If this mechanism is to be used, it is common for advisory groups to meet less frequently. Sometimes advisory groups might engage members of organizations that are, or become, critical of the programme operation. Where this occurs it is even more important that these groups are involved in the advisory structure and have an opportunity to air their concerns. At least one senior member of the programme management team should also be part of the advisory group.

It is rarely a good idea to ignore programme critics. If groups are ignored they will have an additional grievance to add to their critical concerns. To work well, the working group should have well-defined working procedures and a clear work plan – extending to the eventual implementation. It is important to have good communication within the group. To this end, there should be someone in the working group responsible for disseminating information among members.

BOX 3.3: **An effective campaign: Mothers Against Drunk Driving (MADD), USA**

Mothers Against Drunk Driving (MADD) works to prevent drinking and driving, to support the victims of crashes involving drink-driving and to prevent underage drinking. MADD was founded in 1980 by a small group of grieving mothers and has grown into a network of around 600 affiliates with two million members and supporters in the United States. MADD works through research-based programmes, policy initiatives, victim services and public education.

As well as running public awareness campaigns and youth programmes, MADD has advocated for the passage of numerous drinking and driving, and underage drinking laws. At federal level, MADD lobbied for the passage of the national 21 minimum drinking age law in 1984, and the 1995 'zero tolerance' provision, making it illegal for those under 21 years of age to drive after consuming alcohol. In 2000 MADD advocated for a federal BAC limit of 0.08. MADD also advocates for sobriety checkpoints, primary seat-belt laws and stricter penalties for repeat offenders and other high-risk offenders, as well as other key research-based legislation in states across the country.

More information: www.madd.org

3.2 How to prepare a plan of action

Before a comprehensive drinking and driving programme can be implemented, a plan must be set up that lays out a clear strategy for how the objectives of the programme will be met. This plan must be backed up by data, as described in Module 2. The plan will identify the problem (based on the situation assessment), state the objectives, select the dominant method for reaching the objectives, describe in detail the components of the programme, assign responsibility for the development/implementation of these programme components to specific individuals/agencies, and specify the timing.

Figure 3.2 shows the general steps involved in developing an action plan (step 3) and how these fit in with other processes described in this manual. A more in-depth discussion on developing an action plan for a national policy is found in *Developing policies to prevent injuries and violence: guidelines for policy-makers and planners (2).*

A plan of action can be prepared at a national, regional or even town level.

Figure 3.2 **General stages of a drinking and driving programme: from assessment to evaluation**

3.2.1 Identifying the problem

As described in Module 2, a critical element of any intervention programme is to identify the main problem group (or groups). Information on this may already be available from a variety of sources, in particular the assessment proposed in Module 2. Critical data are likely to be:

- breath tests conducted on crash-involved drivers;
- blood tests on crash fatalities;
- admission information from hospital accident and emergency departments;
- random breath checks (conducted either for enforcement or research);
- public/police anecdotal evidence (for example, about people leaving clubs).

The types of information that should be obtained are:

- the age, sex and social groupings of those involved;
- the times when the behaviour is most prevalent;
- the location(s) where the drinking and driving takes place.

This type of information helps to prioritise activities, and to plan and focus interventions where they are most needed. There must also be a clear statement of problems with respect to public knowledge, legislation, enforcement and penalties. While these are not independent, some issues clearly depend on others. Enforcement, for example, is very difficult if there is no clear, legal definition of "drunk" driving – such as illegal BAC levels.

3.2.2 Setting the programme's objectives

The objectives are developed by examining the data collected in the situational assessment. This information must be analysed by the working group to identify the problems to be addressed in the programme.

In considering appropriate solutions to the problems, the working group should follow a "systems approach". That is, one which considers understanding the system as a whole and identifying where there is potential for intervention. Solutions are thus likely to include factors that address the public, such as education, as well as enforcement of laws and regulations, which are combined over a period of time.

Programme objectives may include:

- reduction in crashes;
- reduction in fatal injuries resulting from crashes involving drinking and driving;
- reduction in the incidence of drinking and driving;
- increase in level of community concern about drinking and driving;
- increase in community support for drink-driving initiatives;
- increase in drivers and riders acting to change their drinking and driving behaviour;
- increase in driver perception of stronger enforcement of illegal alcohol laws.

BOX 3.4: **Suraksha Sanchara preliminary investigation, Bangalore, India**

In 2000, GRSP and Bangalore Agenda Task Force (BATF) facilitated the development of a partnership road safety programme for Bangalore known as *Suraksha Sanchara* (Safe Travel). As part of the first phase of the project, the National Institute for Mental Health and Neuro Sciences (NIMHANS) led a study to establish the extent of the problem of crashes involving drinking and driving, and exploring knowledge, attitudes and practices among drivers with regard to drinking and driving.

The study ran in two phases: the first was a hospital-based study covering 12 major hospitals in Bangalore, and the second was a roadside survey undertaken during the same period.

The hospital surveys revealed that nearly 28% of traffic injuries were attributable to alcohol. A typical case would involve a young man, semi-literate, who had been excessively drinking spirits in a bar, alone or partying, then getting on a two wheeler and sustaining injuries in a skid or head-on collision.

The roadside survey revealed that the proportion of drivers under the influence of alcohol varied from 11% (as detected by the older methodology of police testing drivers selectively on suspicion) to 40% (as detected by the newer methodology of random checking). Among those testing positive, 35% were above the legally permissible BAC limit – 0.03 – when checked with a breathalyzer. Again, it was typically a young male (25–39 years), literate, who had been drinking heavily in bars or at parties, who was knowledgeable about hazards of drinking but ignorant of dangers or legal consequences, who was posing greater dangers on the road. Bus and matador mini bus drivers comprised nearly one quarter of those testing positive.

Based on the results of the study, ten recommendations were put forward by policy-makers, professionals, public and press. These recommendations included:

- strict enforcement programmes with stiff penalties must be undertaken by the police;
- awareness programmes must focus on 25–45 year-olds, two wheeler drivers, heavy vehicle drivers, and people drinking in bars and retail stores;
- systematic training and awareness programmes for bartenders and retail shop owners to help them limit the sale of alcohol to customers, especially those reaching danger levels;
- governments should seriously consider closing times for bars and limiting last-minute service in bars to one hour before closure. Also, public transport must be easily accessible and available to deter people from driving after drinking;
- hospital-based surveillance (active reporting system) must be established to report all road traffic injuries (on a few vital parameters) to document long-term changing patterns and track the ongoing epidemic. Further, all hospitals should compulsorily check for breath/blood alcohol levels among traffic injuries.

More information: *www.nimhans.kar.nic.in/deaddiction/lit/BATFReport.pdf*

3.2.3 Setting clear targets

Once the main problems are clear and the general objectives have been set, specific targets can be set. The objective to decrease the incidence of drinking and driving, for instance, might be stated as "decreasing the number of crashes caused by a driver impaired by alcohol by a specified amount, over a given time period". It is generally preferable to set measurable, time-limited objectives; these can be expressed in terms of a target, for example, percentage reduction (or improvement) to be achieved by a certain date. Having targets generally results in more realistic road safety programmes, a better use of public funds and other resources, and greater credibility of those operating the programmes *(3)*.

Any targets also need to take account of the rapidly increasing motorization in many low-income countries; this means that sometimes "standing still" (in terms of crash statistics) can mean that some progress is being made. Such objectives must be measurable and can range from changing attitudes or knowledge, changing behaviour, or reducing the numbers of specific types of crash (for example those involving alcohol). The selection of relevant targets should be made in direct reference to the specific objectives. A range of targets for different objectives is outlined in Table 3.1 (the best range for a particular country will depend on what information is available, or collectable).

Table 3.1 Possible targets for drinking and driving programme objectives

Programme objective	Example performance targets
Reduction in the number of crashes involving drinking and driving (see above paragraph)	Reduction in the number of fatal crashes involving at least one driver/rider with an illegal BAC Reduction in the number of fatal crashes per registered vehicle involving at least one driver/rider with an illegal BAC
Reduction in fatalities resulting from crashes involving drinking and driving (see above paragraph)	Reduction in the number of killed riders and drivers with a recorded illegal BAC Reduction in the number of serious injuries occurring in crashes where an illegal BAC has been recorded for at least one rider or driver
Reduction in the incidence of drink-driving	Reduction in the proportion of drivers with an illegal BAC recorded at (standard) random road checks Reduction in the proportion of drivers with an illegal BAC identified at police random breath-testing stations
Increase in level of community concern about drink-driving	Proportion of population sample survey who identify drink-driving as a crime or a major community problem
Increase in community support for drink-driving initiatives	Level of community support, measured in survey, for strong (or stronger) enforcement and penalties for drink-driving behaviour
Increase in drivers and riders acting to change their drink-driving behaviour	Number of drivers/riders agreeing not to drink and drive in self reported surveys Number of drivers/riders using breath-alcohol testers prior to driving after drinking Proportion of population prepared to not drive if planning to drink in a social setting
Increase in driver perception of stronger enforcement of illegal alcohol laws	Number of drivers/riders believing enforcement activity is more extensive than previously through survey Number of drivers/riders charged with drink-driving offences

Performance targets should be developed in close consultation with partner agencies that may be responsible for initiating action to achieve the targets. Joint acceptance of targets is a critical requirement and is a key part of the coordination role required of the lead agency. The list above is not comprehensive, but is provided to indicate that a range of specific objectives could well be appropriate for a programme.

Once an objective is selected, the specific measures and target levels of performance need to be identified. Baseline measures of all relevant performance criteria should be made. Benchmark measurements represent the basis on which the performance of the programme should be measured.

3.2.4 Setting performance indicators

Once targets are set by the working group, performance indicators that will measure the progress towards the target must be agreed upon. Performance indicators are measures that indicate changes and improvements in areas of concern such as:

- legislation in place;
- legislation being enforced – e.g. number of breath tests carried out;
- number of convictions for illegal BAC levels;
- percentage of road crash victims admitted to hospital with illegal BAC levels.

In order to show changes and improvements, these data need to be compared to the baseline data.

Typical performance indicators include:

- proportion of drivers/riders above legal limit – from roadside surveys;
- percentage of crashes involving drunk drivers/riders.

Further measurement criteria may also be created, particularly for the purpose of monitoring the project. These new indicators may not be readily available, though they should not be difficult to set up. They include:

- numbers of traffic police trained to use BAC equipment and the number of patrols;
- the frequency of public awareness campaigns and public awareness of the messages;
- public attitudes to drinking and driving – from surveys.

For each indicator there should be a specific target. These targets will generally be quantifiable, though they may in some cases be qualitative. In any case, they should be realistic. The issue of performance indicators is also discussed in Module 4 in the context of monitoring and evaluating the programme.

BOX 3.5: **Targets for reducing drinking and driving incidents, Poland**

The Polish national road safety programme, GAMBIT, sets the ambitious target of reducing the number of fatalities resulting from drinking and driving from 12.2% of total road crash fatalities in 2003 to 6% by 2013.

Statistics collected by traffic police indicate that progress is being made towards achieving this target. For example, the Polish government increased sanctions for drinking and driving offenders in 2000, when there were 1156 deaths attributed to drunken road users. By 2005, police statistics showed almost a 30% decrease in the number of fatalities (825) caused by drink-driving road users.

More information: *www.krbrd.gov.pl*

3.2.5 Deciding on activities

After specifying the objectives, targets and indicators, the working group must decide on and plan activities. The scope and range of activities used will depend largely on local circumstances and budgets.

As with any programme to reduce road traffic injuries, the approach must involve a wide range of disciplines. Those to be involved in each activity must be identified. Activities will fall into the broad categories of legislation, enforcement, punishments and sanctions, public information and education campaigns. In the implementation process, measures to inform and educate the public about any changes in legislation or the dangers of drinking and driving should always come before the beginning of more intensified enforcement. Enforcement should be undertaken only where the infrastructure is in place (e.g. where there is legislation and the capacity for enforcement) and where the public has already been informed. Table 3.2 is an example of typical activities that may be carried out in the various stages of a drinking and driving programme.

The most productive strategies use **education** to gain community acceptance and raise awareness and **enforcement** to achieve a cultural shift in drivers' behaviour – to change the community and drivers' focus to a "road safety" mentality. This emphasises the benefits of education coupled with enforcement – neither will work in isolation from the other.

3.2.6 Piloting the programme in a community or region

Implementing a smaller scale "pilot" project in carefully selected community or region can provide an extremely valuable opportunity to test the approach, type and impact of activities prescribed in the larger programme. The lessons learned though the pilot project can be used to improve the programme before it is implemented on a broader scale. Criteria for selecting the community or region for piloting the programme might include: sufficient good quality data showing crashes involving drinking and driving are a problem (e.g. from police and/or hospitals); clear community support for an intervention to prevent drinking and driving; clear support from a key stakeholder (such as the head of the traffic police, a high level government official or representative from the health sector) and their willingness to take a leading role in developing and implementing a campaign to reduce drinking and driving in their community or region.

Table 3.2 Possible stages of programme development and implementation

	Programme development		Programme implementation		
	1. Understand the problem (Module 2)	2. Programme and action plan development (Module 3)	3. Public education/ information campaigns (Module 3)	4. Enforcement (Module 3)	5. Evaluation, sustainability of the programme (Module 4)
Objectives	Understand the characteristics of the road safety situation, in particular to understand the scope and characteristics of the problem of drinking and driving in the country or region	1. Establish working group based on stakeholder analysis 2. Develop a targeted programme to reduce the incidence of crashes involving drinking and driving based on the results of the situation assessment	Increase public awareness, about drinking and driving Increase community support for drink-driving initiatives Increase in drivers and riders acting to change their drink-driving behaviour Increase police capacity to enforce laws Start to reduce crashes involving drinking and driving	Increase in perception of drivers of stronger enforcement of illegal alcohol laws Intensify police enforcement of drinking and driving laws Greater reduction in the number of crashes involving alcohol	Further increase rate of reduction of road crashes involving alcohol Ensure sustainability of the programme Feedback to plan based on evaluation results and improvement of programme
Assessments	Situation assessment by performing: 1. Road safety and crash data assessment 2. Assess legislation 3. Assess level of enforcement of current legislation and appropriateness of punishments 4. Assess community perspectives 5. Conduct stakeholder analysis	Assess police capacities to enforce any new laws Training and equipment may be necessary			Reassess road safety and crash data Community perception Stakeholder analysis Level of enforcement of new legislation
Legislation		Develop/ amend law(s) Pass the law(s) through appropriate legal channels	Inform public about new or amended law/s		

3.2.7 Setting a timeframe

An action programme to reduce drinking and driving will include both "preparatory steps" (involving legislation) and "launching steps" (ensuring compliance with the laws and regulations through incentives and enforcement). The timing of each step should be considered when planning the project.

The timeframe will depend on activities agreed upon. For example, if legislation is to be developed and implemented, it may be decided to phase in enforcement of the new law gradually in different areas. However, clearly an overall timeline must be agreed upon at an early stage in the planning process, as this may be affected by resources.

3.2.8 Estimating resource needs

A drinking and driving programme requires adequate financial and human resources in order to bring about the desired change in road user behaviour. Both mass media campaigns and equipping the police (with of training and equipment) are likely to be expensive. Additionally, any credible and effective "new" intervention programme is likely to take several years and will need to be monitored and managed for many years to come.

Any country planning an intervention strategy to reduce drinking and driving therefore needs to make sensible estimates of the funding that will be required. This will need to be done based on the estimated size of the problem, any similar projects previously undertaken, the specific interventions planned and the likely resistance. The case needs to be made that money spent on road safety is an investment which makes sound economic sense in terms of the social and economic returns it will deliver.

As part of designing the programme, it is therefore important that the following steps are taken:

- the human resource needs, including training, should be estimated;
- the costs of implementing the programme must be broken down by component and by activity chosen;
- national and international funding sources must be identified. Ideally, ministries involved in implementing the programme should adjust their budgets to reflect the new activities. In the short term, the working group can try to secure financial support from donors.

Failure to address fully the resource needs for implementation during the planning stage can jeopardize the success of the programme. Thus it is important that the working group is realistic in estimating the likelihood of being able to secure the funding needs of the programme.

Having worked out the programme's activities in detail, the working group can calculate the cost of each of activity and draw up a budget (e.g. based on quotes from suppliers or on the cost of recent similar undertakings).

When formulating budgets, the following actions are recommended:

- estimating the funds available for the duration of the programme and specific activities;
- setting priorities, with activities phased if necessary to ensure that priority activities receive adequate funding;
- discussing with other government departments, non-profit-making organizations and private sector firms about similar projects already undertaken, and their costs;
- estimating the likely administrative and operational expenses in implementing the programme;
- estimating the cost of monitoring and evaluation;
- planning for financial reports at regular intervals.

There are two methods for costing a programme:

Total costs: this involves the cost for each activity, plus the allocation of human resources and equipment used in the programme. If, for example, the traffic police have cars for highway patrols that will be used to enforce drink-driving laws, then part of the cost of the police cars can be *allocated to the programme.*

Marginal costs: this involves only costs directly related to the implementation of the programme, including new purchases.

It is estimated that road traffic injuries and death cost developing countries US$ 65 billion per year *(4)*. An effective drinking and driving programme that significantly reduces the number of road crashes caused by drunk-driving road users can make a major economic impact. It is essential, therefore, that the government has ownership of the programme and finances it. Table 3.3 below provides some suggestions on how this might be done.

Table 3.3 Possible ways to fund a drinking and driving programme

Reinvestment	Some of the money from fines for non-compliance can be reinvested in a central fund to support public education and to help train the police to enforce the law. Similarly, funds from fuel tax, motorcycle licence and registration fees can be earmarked for particular purposes related to the drinking and driving programme.
Sponsorship*	Corporate groups often sponsor activities they see as worthwhile, and they may fund specific components of the programme.
Donor organizations	Development aid agencies and other charitable organizations are possible sources for funding a drinking and driving programme. In a similar way, road safety organizations and educational bodies may provide funding or contribute technical expertise.

* Due regard should be given to any conflict of interest which should arise.

Practitioners often need to seek support funding from sources other than government, and to develop public-private partnerships. Historically, supporters of road safety programmes and projects have included industries such as those involved with fuel, cars, tyres, insurance and the production of alcoholic drinks. In some countries offenders' fines can be applied to road safety programmes.

NOTE

Stop driving while intoxicated, New York, United States

Under New York's Stop-DWI (Driving While Intoxicated) programme, state law mandates that revenue from DWI fines be returned to the county where the DWI offence occurred. An evaluation of the programme demonstrated that this type of self-sufficient programme is viable and may reduce crashes involving drinking and driving. Additionally, National Highway Traffic Safety Administration (NHTSA) revealed that community-level funding for drinking and driving law enforcement and treatment is characteristic of drink-driving programmes implemented in four of the five US states where significant reductions in crashes caused by drunk drivers have occurred.

More information:
www.nhtsa.dot.gov/people/injury/alcohol/IPTReport/FinalAlcoholIPT-03.pdf

3.2.9 Promoting the programme

It is likely that any significant new drink-driving programme will generate a national debate and this is to be supported (and amplified) since it will allow the arguments to be aired and the public (not just drivers) to be informed. Such promotions can be initiated by ministerial statements at conferences (political or otherwise) or workshops to which the media can be invited. If the person championing the programme is a high-profile celebrity, he or she could also be involved in the promotion as this will personalise and de-politicise the campaign.

While promotion is especially important at the start of any programme it should be maintained throughout. In many countries this ongoing promotion can be tied to local holidays or festivals. The promotion can also be maintained by issuing regular press notices and holding launches of new campaigns, posters and commercials.

3.2.10 Setting up a monitoring mechanism

Methods for evaluating and monitoring the programme are described in Module 4 of this manual. The brief description in this section is meant to provide the reader with a more general understanding of the types of activities in a drinking and driving

programme that should be monitored. In general, monitoring the programme involves keeping a close check on all measurement indicators, to ensure the programme is on track towards the goals set out.

Monitoring can be:

- **continuous**, with the lead agency of the working group overseeing the overall programme in case problems arise;
- **periodic**, with activities measured at the end of each stage of implementation.

Table 3.4 gives an example of what might be monitored during a typical drinking and driving programme, and the possible actions to take if the indicators suggest that activities are missing their objectives. It is important to:

- define resources for the task – human and financial resources should be allocated at the outset of the process to ensure that the monitoring and evaluation takes place at an appropriate time, and that the results are disseminated;
- define the mechanism for monitoring – set out who will be responsible for monitoring progress, at what intervals progress should be reported and to whom, and how implementation can be improved as early as possible, where necessary;
- put in place a feedback mechanism to allow the regular revision of a programme, allowing improvements to the programme's accuracy and relevance where necessary;
- evaluate the programme periodically to determine its effectiveness (evaluation methods are discussed in more detail in Module 4).

Table 3.4 Defining indicators and actions for monitoring

Activity	Indicator(s) for monitoring	Actions to take if monitoring suggests activity is below target
Increasing public awareness of the dangers of drinking and driving	• number and frequency of publicity spots in the media • amount of feedback from target audience	• improve persuasiveness of media stories and messages
Increasing capacity of police to enforce	• increase in the number of drivers stopped and tested • extent of area covered by enforcement • number of penalties issued	• increase size of traffic police force • change enforcement areas • improve system of issuing penalties and collecting fines
Designing awareness campaign on road safety and drinking and driving	• level of awareness of traffic safety • level of awareness of dangers of drunk driving • level of knowledge of drinking and driving laws and their enforcement • observed (or self-reported) changes in behaviour	• redefine target audience • redefine message(s) • evaluate the means of delivering the messages and change it if necessary

3.2.11 Identify capacity-building and training requirements

A team of well trained professionals is needed to bring about long-term sustainable improvements in road safety. They will probably have both "hard" (engineering) and "soft" (psychological) skills. For some members of the team, training opportunities overseas could be beneficial to provide enhanced knowledge and skills of interventions that have proven effective elsewhere. In fact, professional development will need to be considered at all points of the delivery chain.

The police will need training if changes to enforcement activity are envisaged. Hospital staff may need to be trained in measuring BACs. Equally, managers and staff who work in premises licensed to sell beverage alcohol may require training to ensure their dealings with customers are professional and conducted within the law. They may also need training in ways to provide assistance to alcohol-impaired customers.

3.2.12 Ensuring sustainability of the programme

The sustainability of a drinking and driving programme is essential to ensure that any benefits that result from the programme persist. In developing the action plan, it is therefore important to anticipate longer term funding requirements, and the possibility of reinforcement of any communications components of a drinking and driving programme. Thus, for example, if improving enforcement of drinking and driving laws is a project objective, the capacity for enforcement to be provided beyond a short campaign must be considered, and the strategy for enforcement must be made sustainable – with funds allocated on a yearly basis to support the operational capacity of the traffic police. What has been achieved must be maintained, with future programmes aiming at the next level of compliance.

Successfully sustaining a programme also requires that the components of the programme are evaluated to determine what worked and what did not work (see Module 4). The results of this evaluation should be fed back into the design and implementation of future activities.

3.2.13 Celebrating success

When successful outcomes have been identified, it is recommended that both formal and informal activities be arranged with staff from participating agencies to celebrate success. In road safety projects the major benefit that staff receive from participation in a successful project is personal satisfaction. Positive endorsement by senior management of the value of their work is a critical component for maintaining staff morale and showing all participants that their work is acknowledged and acclaimed.

The above sections have described the general steps involved in developing a drinking and driving programme, beginning with an assessment of the current situation (explored further in Module 2). The following sections of this module provide

greater detail on the particular components of a national or regional drinking and driving programme, including legislation, enforcement, public information/education campaigns, and community-based initiatives.

3.3 Interventions

As outlined in Table 2.6 in Module 2, experience and research have shown a variety of interventions to be effective or essential in reducing the number of road crashes involving drinking and driving in a country or region. It is highly recommended that a national or regional drinking and driving programme includes the "high priority" interventions listed in the table. The scope and impact of your programme in terms of preventing drinking and driving will benefit from the inclusion of additional interventions that are most relevant to the specific drink-driving situation in your country or region (see Table 3.5 on the effectiveness of drinking and driving legislation and its enforcement).

The sections below provide more extensive information on many of the interventions listed in Table 2.6. It is hoped this information will be help you understand why these interventions are considered essential and/or effective, and the steps that need to be considered when implementing these interventions in your country or region.

3.3.1 How to develop and implement laws on drinking and driving

Targeted and appropriate legislation on drinking and driving that is consistently enforced and well understood by the public is a critical component of a country or region's efforts to control drinking and driving. There are a number of steps that need to be taken when designing effective drinking and driving legislation. The first step in this process is undertaking an assessment of relevant legislation that is already in place (see Module 2).

Should you identify that the laws need reforming or that new laws are required, the goals of the reforms and new laws should be agreed. These are likely to include one or more of the following:

- address the absence of legislation;
- strengthen an existing law;
- offer further guidance and support to enforce legislation;
- provide greater legitimacy for the law, so that those responsible can enforce it more effectively.

In addition to the information you obtain through your assessment, the following list provides some possible considerations when attempting to formulate coherent drinking and driving laws.

- What level of punishment should be set to deter drivers and, importantly, prevent drivers from re-offending? (see section 3.3.3)
- What devices are going to be used to provide evidential BAC information (evidential BAC readings are those which can be used as evidence in a court of law)?
- Will the responsible authorities be able to implement new legislation and ensure its enforcement?

NOTE

Police powers

Both Europe and North America have given police officers the power to demand a breath specimen or to undertake a sobriety test. Legislation in the countries of these regions also gives officers the power to make arrests if the person is over a prescribed limit. In addition, there are requirements either to provide an evidential breath specimen or a specimen of blood or urine for analysis, either as written in legislation or, as in the US for example, the consent is "implied" because they hold a driving licence.

Additional police powers include the power to enter premises, if necessary by force, to find the suspected driver of a vehicle involved in a road traffic collision and believed to be under the influence of alcohol. In the UK a refusal to be tested is punished in the same way as being over the legal limit.

In many countries all drivers involved in a crash are automatically given a BAC test.

Most countries have a general traffic law which makes driving while "drunk" an offence. Not all specify "drunk" in terms of BAC or BrAC levels. Even if this is specified, it can often be impractical to carry out a blood or urine test in order to check the level, hence making enforcement difficult. Modern breath-testing equipment allows traffic police to check for impairment at the roadside and the law should allow such test results to be used as evidence in court.

NOTE

An effective drinking and driving law will:

- make it illegal to drive with a BAC above a certain level;
- allow roadside testing (using approved equipment) and admit the results to a court of justice as evidence;
- require drivers to give a breath test when asked to do so by the police, and make it an offence to refuse;
- prescribe the penalties for the offence.

Table 3.5 **Effectiveness of drinking and driving legislation and its enforcement *(per 100 000 population)***

			Attributable fractions (per 100,000 deaths)		Effectiveness of drinking and driving laws and random breath testing	
World Bank region	**WHO subregion**	**Sex**	**Deaths attributed to traffic accidents***	**Deaths attributed to traffic accidents involving drinking and driving***	**Reduced deaths (per 100,000)**	**Reduced years lost due to disability (per 100,000)**
Europe and Central Asia	Europe B	Male	1473	657	141	77
		Female	542	74	16	6
	Europe C	Male	2197	1396	299	193
		Female	799	223	48	30
Latin America and the Caribbean	Americas B	Male	4358	2053	439	148
		Female	1514	220	47	12
	Americas D	Male	2599	861	184	64
		Female	1093	101	22	6
Sub-Saharan Africa	Africa D	Male	2159	417	89	43
		Female	1079	90	19	9
	Africa E	Male	2075	803	172	107
		Female	1027	123	26	17
East Asia and the Pacific	South-East Asia B	Male	7809	1993	427	164
		Female	2343	127	27	8
	Western Pacific B	Male	3629	723	155	66
		Female	1790	157	34	12
South Asia	South-East Asia D	Male	3689	591	126	45
		Female	1451	53	11	3

Key: B = low child mortality, low adult mortality; C = low child mortality, high adult mortality; D = high child mortality, high adult mortality; E = high child mortality, very high adult mortality.

* Percentages for all age groups combined shown here.

Source: *(5)*

Table 3.6 Wording of legal texts relating to drinking and driving in various countries

Argentina: *BAC (g/l):* 0.5 g/litre

Text: It is prohibited to drive any type of vehicle with a BAC above 500 mg/litre. In the case of driving a motorcycle it is prohibited to drive with a BAC above 200 mg/litre. For public transport or cargo vehicles it is prohibited to drive with any BAC above 0.

Source: National Traffic and Highway Safety Law 24.449, article 48 – as amended by article 17 of Law 24.788 (1997) – National Law on the Prevention of Alcoholism.

Botswana: *BAC (g/l):* 0.8 g/litre

Text: The Blood Alcohol Content (BAC) is 80 mg/litre of blood. The BAC Testing Rules: – any driver maybe required by a police officer to provide a specimen of breath; – where such a person is, for reasons of injury or disability, unable to provide a specimen of breath, he may be required to provide a specimen of blood; – failure to provide any of the above samples will be treated as supporting any other evidence that the driver is unfit to drive and in addition will be liable to a charge of Failure to provide a sample.

Source: Road Traffic Act

Singapore: *BAC (g/l):* 0.8 g/litre

Text: Prior to taking a specimen of blood for analysis, the person's breath will be tested by a police officer with the prescribed breath alcohol analyser. If he fails the test, he will then be required to provide at a hospital a specimen of his blood for a laboratory test to determine the alcohol content in the blood. The current prescribed limits are: a) 35 microgrammes of alcohol in 100 millilitres of breath; or b) 80 milligrammes of alcohol in 100 millilitres of blood.

Source: Section 67-71C of the Road Traffic Act

Spain: *BAC (g/l):* 0.5 g/litre

Text: For vehicles with 9 passenger seats, or total weight over 3500 kilograms, or vehicles transporting heavy goods, or public transport vehicles, a BAC limit of 0.3 g/litre applies. The BAC level for new drivers (who obtained driving licence within 2 years of the issue of the licence) is 0.3 g/litre.

Source: Reglamento General de Circulacion, Real Decree 2282/1998, Articulate 20. Rates of alcohol in the blood.

Viet Nam: *BAC (g/l):* 0.5 g/litre

Text:

Article 8, Prohibited behaviours Item 8: Drunk driving, where the blood alcohol level is over 80 mg/100 ml, or the breath alcohol level is over 40 mg/litre, or driving while under the influence of other prohibited stimulants.

Source: Law on Road Traffic (Reference 26/ 2001/QH10)
Source: Instruction – Ensure the safety of road and urban traffic (Reference 36/2001/NĐ-CP)

Article 29, Prohibiting driving in one of following cases Item 2: Driving while the blood alcohol level is over 80 mg/100 ml, or where the breath alcohol level is over 40 mg/litre, or while using other stimulants.

Source: Decree Regulations on solving administrative breaches in Road Traffic 152/2005/NĐ-CP

Article 12, Fines for drivers and passengers in cars and other vehicles who infringe Road Traffic regulations Section 7: Fines of 1–2 million VND will be made for the following driving offences:
Item b: Drunk driving, where the blood or breath alcohol content level exceeds regular limits, or where other prohibited stimulants have been used while driving; or not agreeing to give a blood sample to traffic police for alcohol testing.

Source: Decree Regulations on solving administrative breaches in Road Traffic 152/2005/NĐ-CP

Introducing and implementing legislation

For maximum effectiveness, legislation on drinking and driving needs strong support from the highest levels of government, sending a clear message to society that drink-driving and traffic safety are vital national issues.

The working group is an essential element in promoting and gaining approval for the legislation. Members of the group, who are government officials, policy-makers, or injury prevention specialists, will have the greatest influence in convincing others of the need for a law.

The following questions should be considered when introducing a new law and the answers should be incorporated in your action plan:

- Which agencies will be most effective and influential in implementing legislation?
- Are the capabilities of the agencies adequately addressed in the legislation?
- Is the proposed legislation worded in an appropriate way, so as to gain support (see Table 3.6 for examples of wording)?
- What are the proposed penalties for drivers disobeying the law? Are these penalties appropriate and are they likely to be effective?

NOTE

Implementing and enforcing the law will often be a much greater hurdle than introducing it, particularly in low and middle-income countries. Guidance on implementation and enforcement is therefore critical.

It may be necessary to phase-in the implementation of new legislation: in such a case, areas with large numbers of road crashes involving drinking and driving should be the ones selected first. For example, commence enforcement in a city with strong police resources and commitment, and a known high level of alcohol consumption.

Setting BAC levels

As presented in Module 1, blood alcohol concentration (BAC) is a key concept in terms of linking alcohol to road crashes. Drivers who have consumed alcohol are more likely to be involved in a road crash than drivers who have not consumed alcohol. The effects of alcohol on driving performance are directly related to BAC levels. The factors which determine an individual's BAC following alcohol consumption are presented in Appendix 1. The effects of alcohol on the body at a given BAC are largely universal and Table 1.1, Module 1 summarises these effects.

BAC limits which have been adopted by various countries are presented below in Table 3.7. Setting a BAC limit that is appropriate for your country and culture is critical in gaining and maintaining public acceptance for the law.

As shown in Module 1, there is overwhelming evidence that crash risk increases rapidly above 0.08 g/100 ml. Anything higher than this can be strongly criticised in road safety terms. The European Commission recommends a 0.05 g/100 ml BAC level.

Table 3.7 Standard maximum legal BAC limits for drivers by country or area

Country or area	BAC (g/100 ml)	Country or area	BAC (g/100 ml)
Australia	0.05	Luxembourg	0.05
Austria	0.05	Netherlands	0.05
Belgium	0.05	New Zealand	0.08
Benin	0.08	Norway	0.05
Botswana	0.08	Portugal	0.05
Brazil	0.08	Russian Federation	0.02
Canada	0.08	South Africa	0.05
Côte d'Ivoire	0.08	Spain	0.05
Czech Republic	0.05	Swaziland	0.08
Denmark	0.05	Sweden	0.02
Estonia	0.02	Switzerland	0.08
Finland	0.05	Uganda	0.15
France	0.05	United Kingdom	0.08
Germany	0.05	United Republic of Tanzania	0.08
Greece	0.05	United States of America*	0.10 or 0.08
Hungary	0.05	Zambia	0.08
Ireland	0.08	Zimbabwe	0.08
Italy	0.05		
Japan	0.00		
Lesotho	0.08		

* Depends on state legislation

Source: *(4)*

There is a growing international move towards introducing differential BAC limits, for example adopting a minimum 0.05 limit with a relatively small penalty for offenders and severer penalties for offenders caught with higher BAC levels.

NOTE

In South Korea, the law regarding BAC levels states:

- drivers below 0.05 – no penalty
- drivers with a BAC of 0.05–0.09 – 100 days of licence suspension
- drivers with a BAC of 0.09–0.10 – cancellation of driving licence
- drivers with a BAC of 0.10–0.36 – arrest
- an individual caught driving while drunk 3 times within a 5 year period, or 2 times in 3 years, is arrested.

If your country is setting a limit for the first time, there may be an advantage in using 0.08 for a period until drivers become used to the new regime, and then reducing it and applying differential limits for different classes and age of driver, for example setting a lower BAC level for high risk groups and those with responsibility for passengers or heavy vehicles. The law must be enforceable and broadly accepted by the public, if it is to be effective and not widely flouted.

France, for example, first set a BAC level of 0.08 in 1978. This was reduced to 0.07 in 1995 and is now set at the level of 0.05, as recommended by the European Commission.

Lower BAC limits for specific groups of drivers

Although BAC limits of 0.05 or 0.08 are typical of those imposed on fully licensed drivers travelling for private purposes, lower limits are often employed for other categories of driver. Several countries apply lower limits to **younger** or **less experienced drivers** which appear to be effective in reducing alcohol-related crashes among this group *(7)*.

NOTE

Lower BAC levels for young drivers

In the United States, 30 states have enacted lower BAC limits for young drivers. One study evaluated the effects on drinking and driving of lowered allowable BAC limits for drivers younger than 21 years in these states between 1984 and 1998. Results showed clearly that the changed BAC laws were followed by statistically significant decreases (19%) in the amount of driving after drinking *(8)*.

A review of six studies on the effectiveness of low BAC for younger drivers found a reduction in injuries or crashes after implementation of the law. There was the greatest reduction, 22%, in night-time, single vehicle fatalities in those states with 0.0 BAC laws. In states with 0.02% BAC laws the reduction averaged 17%, and in states with 0.04% to 0.06% BAC laws the reduction was 7% *(9)*.

Drivers of commercial vehicles and public transport operators can also be subject to lower BAC limits. Indeed, some privately owned companies may set their own limits for their drivers; often such policies dictate a 0.00 BAC (see section 3.3.5).

NOTE

BAC limits, Australia

BAC limits vary by state but in the Australian Capital Territory the following driver categories must not exceed a BAC of 0.02:

– taxi drivers
– bus drivers
– dangerous goods vehicles
– heavy vehicles (gross vehicle mass over 4.5 tonnes)
– Commonwealth vehicles
– learner and probationary drivers.

Many drivers do not know what their BAC or BrAC level is after drinking – nor can they calculate it accurately. Some will "allow" themselves one drink (some two) without knowing what this means in terms of BAC. Educating drivers about BAC and risks for harm is critical in creating a responsible drinking and driving culture. For more information on how alcohol affects the body and how BACs are linked to both driving performance and crash risk, see section 1.2.1 in Module 1.

Additional relevant drinking and driving legislation

Legislation specifying BAC limits and how these are to be enforced are a cornerstone of any national or regional programme to reduce drinking and driving. Additional types of legislation targeting, for example, known high risk groups such as young drivers, regulating the sale of beverage alcohol (e.g. to specific hours), taxation on beverage alcohol to decrease its accessibility, and licensing premises selling beverage alcohol have been enacted in many countries in an effort to curb the occurrence of drinking and driving with positive results. A few of these types of legislation are described below.

Minimum legal drinking age

In some countries minimum legal drinking age (MLDA) laws specify an age below which people cannot purchase or publicly consume alcohol. In the US, an individual must be at least 21 years of age to purchase alcoholic beverages; in Denmark the MLDA is set six years lower at 15 years. In several other European countries the MLDA varies for beer, wine and spirits. There is strong evidence to suggest that MLDA laws are effective in preventing crashes involving drinking and driving *(7)*.

NOTE

Statistics collected by the United States General Accounting Office (1987) show that states which adopted the minimum legal drinking age of 21 in the 1980s experienced a 10–15% decline in drink-driving related fatalities among drivers compared with states that did not adopt such laws. Further, the National Highway Traffic Safety Administration (NHTSA) predicts that on average, 1000 fatalities per annum caused by drinking and driving are avoided through the introduction of a MLDA of 21 within US states.

Alcohol sales points

Some regions have implemented laws limiting the hours during which alcohol can be sold, or the density of outlets selling beverage alcohol. There is evidence that, in some circumstances, a relationship exists between alcohol-related problems and both outlet density and hours during which alcohol can be sold, with longer hours and more outlets leading to increased problems and shorter hours and a reduction in outlets resulting in a reduction in such problems, including road deaths *(10)*. These measures may be most effective when they impact upon large geographic areas so as to minimise opportunities for circumvention.

Licensing laws

The licensing laws of a country regulate the general availability of alcohol. A series of measures are employed to control criteria for granting licences for the sale of alcohol, hours during which business may be conducted, the number of licensed premises within a local area and also to set a drinking age, etc. These laws, typically carried out by a "licensing board" (or similar entity) should require that fairly stringent requirements are applied before a licence to sell alcohol is granted to an individual. The aims of the licensing laws are:

- to prevent crime and disorder;
- to maintain public safety;
- to prevent public nuisance;
- to protect children/vulnerable people.

It is in the best interest of businesses serving/selling alcohol that they work within the framework of the licensing law as failure to do so would result in loss of the licence, which leads to loss of income and possible closure of their business.

Developing a timeframe for implementation of laws

It is important that an appropriate timeframe be developed for the implementation of the law. Adequate public awareness must be ensured in order to optimise the success of the law. The timeframe from implementation of the law to full enforcement and penalty for non-compliance can be anything from a couple of months to several years. This will depend on the circumstances, and must be articulated in the overall action plan. Similarly, the indicators by which this component of the programme will be measured must be included in the plan.

Legislative requirements in summary

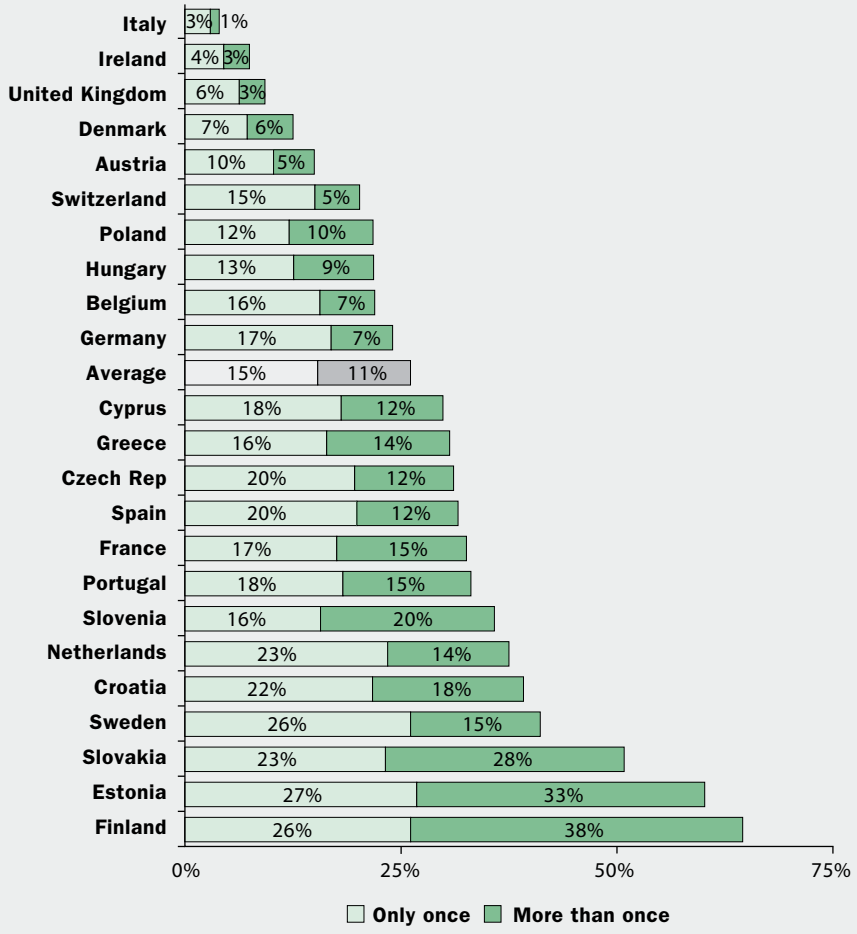
- A country or region seeking to reduce the burden of crashes involving drinking and driving must enact relevant and robust legislation that has strong political support and can be enforced.
- Laws on a maximum BAC limit for drivers/riders is essential. Legislation should specify how BAC levels are to be enforced and what powers are to be given to the police in their enforcement efforts.
- Many countries have lower BAC limits for specific driver groups, such as young drivers, drivers of commercial vehicles, which have proven effective in reducing crashes involving drinking and driving.
- Legislation should state the type of offence and realistic penalties for those offences.
- A coherent drinking and driving policy will, without doubt, reduce the road safety burden, both in terms of lives lost and the financial costs of investigation.

3.3.2 How to enforce drinking and driving laws

Like robust legislation on drinking and driving, the consistent and visible enforcement of drinking and driving laws is a critical component of any drink-driving programme in a country or region, and should be considered a high priority in any action plan. *The community must understand and believe that if they drink and drive there is a strong likelihood of both detection and prosecution.*

The principal objective of police intervention is to save lives and reduce drink-driving related road trauma. Apprehending offenders is a by-product of the intervention, not the main objective itself. As the intervention proves to be successful, apprehensions should decline and allow police to then concentrate on the recidivist drink-drivers.

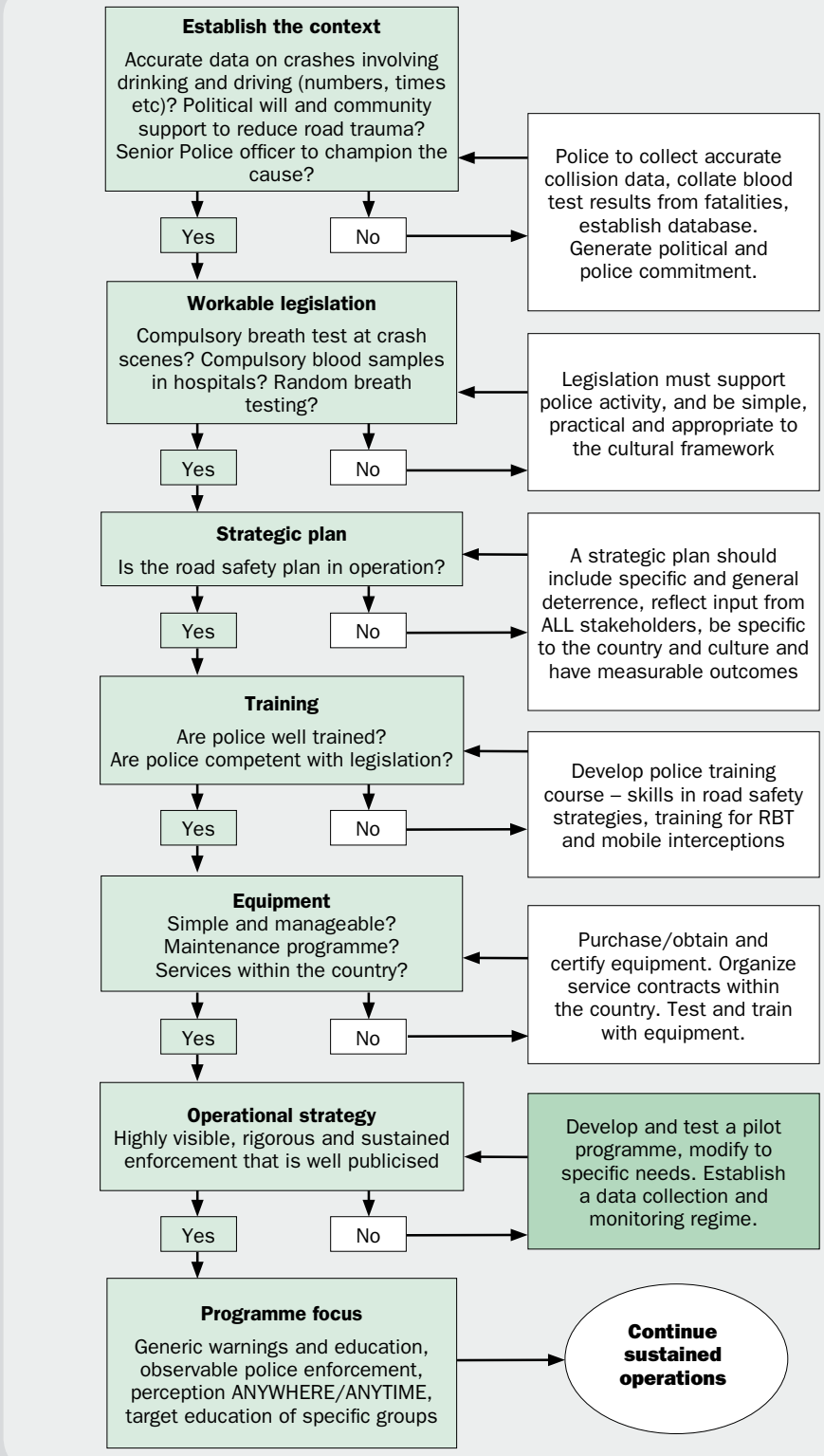
Figure 3.3 **The proportion of drivers in the EU checked by the traffic police for alcohol impairment between 2003–2006**



Source *(11)*

Figure 3.4 provides a simple outline of the steps required for strategic enforcement of drinking and driving laws, each of which is described in greater detail in this section.

Figure 3.4 **Flowchart showing the strategic enforcement of drinking and driving regulations**



The enforcement process

Effective and efficient law enforcement interventions are critical in achieving a reduction in road trauma and do not necessarily require high-cost, modern technology or a huge resource commitment. Enforcement should be "intelligence-led", which requires:

- acknowledging and understanding the drinking and driving problem through data collection and analysis;
- understanding community perceptions and political commitment regarding drinking and driving. Public pressure on politicians can lead to greater support for more intense enforcement of drinking and driving laws. Political will is critical in ensuring consistent community education and the enforcement of drinking and driving laws.
- expanding the programme slowly based on lessons learned in pilot communities. Pilot programmes enforcing drink-driving laws should be undertaken in communities where there is known political and community commitment to reducing the incidence of drinking and driving.

NOTE

Data that can guide intelligence-led enforcement

- Accurate statistics on fatalities, serious injuries, injuries and crashes, and the role alcohol plays as a causal factor.
- Crash data as it relates to times of the day, days of the week and particularly critical locations. If presented in an appropriate format, this data will provide the profile on high alcohol times, days of the week and locations upon which to focus police resources for maximum effect.
- Accurate statistics on the amount of alcohol consumed by offending drivers.
- The locations where drivers consumed the alcohol – this information can assist with targeted enforcement and educational intervention campaigns.
- Blood alcohol readings of drivers admitted to hospital.
- The BAC readings obtained from apprehended offenders.
- The toxicology reports from the coroner's court relative to all deceased drivers.
- The identification of high-risk user groups by age or social standing, thereby assisting strategies for targeted enforcement and specific education.
- Data collected must be accurate and analysed for trends to determine enforcement strategies and, most importantly, must be maintained for assessing performance outcomes.

Senior police officers must take a lead in the initial planning and implementation of intervention strategies. A "champion" in the police field will ensure ownership within the enforcement community and assist in ensuring the sustainability of a national programme on drinking and driving.

Training in effective strategic law enforcement may be helpful in obtaining and maintaining the commitment of police officers to enforce drinking and driving laws, including:

- community education – ensuring the community is educated to understand the dangers of drinking and driving is critical and police should understand the power of the media and how to use it to support road safety education and policing strategies;
- aspects of "general" and "specific" deterrence to bring about crash and injury reduction as the primary objective rather than apprehensions;
  - **General deterrence** strategies focus on preventing illegal behaviours (such as driving while in excess of the prescribed legal BAC limit) by producing and maintaining the perception that such behaviours will be noticed and punished.
  - **Specific deterrence** strategies are aimed at punishing those known to have broken the law in order to prevent them from doing do again.
- the dangers that drink-drivers present on the road – a commonly held perception among some police officers is that only drivers with a very high BAC level are a danger to the community not those just in excess of the legislated limit;
- operation of enforcement needed for gathering evidence.

NOTE

A dedicated alcohol intervention unit

Many countries that have been successful in reducing drinking and driving have dedicated alcohol intervention units within the traffic police. This specific police unit is responsible for the coordination of policing efforts and counter-measures relating to drinking and driving. A dedicated unit provides the benefits of centralised coordination and ability for expertise to be established. It should be responsible for:

- integration with other road safety strategies for road trauma reduction;
- facilitating education campaigns and publicity;
- facilitating training for general police personnel;
- gathering statistical data and intelligence to improve enforcement and detection methods;
- working with industry and large organizations in the provision of education, seminars and workshops on the effects of drinking and driving. The dedicated unit can provide comprehensive advice and education to assist in reducing drinking and driving within industry;
- developing partnerships with government, semi-government agencies and large representative groups such as those within the transport industry and professional drivers. Drinking and driving is a community problem needing community-based solutions. Police cannot and should not be expected to achieve the results without a cooperative and consultative approach.
- maintaining direct links to research organizations. This will enable police to seek independent evaluation and research before, during and after implementing any programmes.

Enforcement methods

Enforcement methods that have been used successfully to change driver behaviour include *alcohol screening of drivers (random and based on "probable cause")*, and *targeted enforcement based on intelligence*. These enforcement methods are not mutually exclusive and should ideally be employed in combination to achieve maximum effect.

Alcohol screening of drivers

The **alcohol screening**[1] **of drivers** provides a prevention-based strategy in the form of extremely visible, high-volume screening. This method reminds drivers of the

1 In some countries, eg the United States, this method is referred to as an "alcohol test", not "alcohol screening".

possibility of being detected if they have been drinking, and reduces their certainty that detection will not occur. Prevention strategies such as alcohol screening should:

- be high profile and highly visible, using "sobriety checkpoints" or roadblock operations to ensure all drivers (or a high percentage of drivers) are tested;
- include stationary vehicle checks at locations such as toll gates, service stations and rest stops.

Some countries such as Australia allow for random alcohol screening, also known as random breath testing (RBT), of any driver at any time. Other countries, such as the United States, require traffic police to establish "probable cause" before a driver can be effectively screened for alcohol consumption in selective breath testing (SBT).

NOTE

Random versus selective breath testing

The US based Task Force on Community Preventive Services (2001) revealed that sobriety checkpoints of both types are effective in reducing crashes involving drinking and driving, and have sizeable economic benefits. Crashes thought to involve drinking and driving dropped an average of 18% (for RBT checkpoints) and 20% (for SBT checkpoints) following implementation of sobriety checkpoints, while fatal crashes thought to involve alcohol dropped a median of 22% (for RBT checkpoints) and 23% (for SBT checkpoints) following implementation of sobriety checkpoints.

Accurate measuring of alcohol in the bloodstream is a vital component of effective enforcement. It is critical to have a screening device which is practical and easy to use. Equipment that lapses into disarray after a few months or needs expensive servicing outside the country of operation (with consequential additional costs and lack of continuity of use of the product) should be avoided (see Appendix 2).

A **minimum annual target** of alcohol screening tests should be set and maintained. Testing can take place at *designated testing stations* (checkpoints or roadblocks) or *during normal police interceptions*. The minimum targets set should relate to the percentage of the driving population tested during the year. A solid strategy aims to test 1:3 drivers annually, although the more progressive enforcement bodies in richer countries aim at 1:1 – on average every driver would expect to be tested once per year.

Targeted enforcement based on intelligence

The second enforcement method commonly used is the detection of drink-drivers at specific locations, times, and under specific circumstances, including:

- stopping drivers as they leave selected alcohol distribution premises such as hotels, entertainment venues, night clubs, sporting venues and gaming venues that should be the subject of police attention on account of the high possibility that drinking and driving may take place;

- during high-risk alcohol times or days of the week (see Module 2);
- at collision zones or high-risk areas;
- breath testing all drivers intercepted by police regardless of the reason for interception, if legislation permits random breath testing;
- breath testing all drivers involved in collisions;
- breath testing individual drivers who are known to continue to drink and drive after initial detection (i.e. repeat drink-drivers). As a principal enforcement measure, covert operations should support the major operational strategies but never take precedence. The main focus must be on high visibility enforcement for the whole of the driving population.

BOX 3.6: **Random breath testing in Australia and Finland**

Australia

In Victoria, the use of special-purpose "booze buses" – clearly identified as random alcohol-screening vehicles and immediately recognisable by the public – have been highly successful in reducing drinking and driving over the past 15 years. These vehicles possess all the necessary equipment to operate as a mobile police station for the efficient processing of offending drivers. The enforcement process is complemented by a highly professional and intense public advertising campaign using television, radio, print media and billboards.

Finland

Since random breath testing was introduced in Finland in 1977 the rate of drinking and driving has been reduced by 50%, and there were notable reductions in deaths and injuries from crashes associated with drinking. Researchers found that problem drinkers are more likely to be driving in morning traffic, when vulnerable road users such as children are using the road network, and are more likely to be detected by random breath testing than by other police activities *(12)*. Random breath testing was judged to be a popular measure with the public and a measure that paid for itself through savings in health care and other resources.

Alcohol screening checkpoints

The use of alcohol screening checkpoints, also referred to as sobriety checkpoints or roadblocks, is an effective way of detecting and apprehending those who drink and drive. They allow a high profile, visible police presence, and provide an effective deterrent to other motorists who are not stopped. Checkpoints are used to achieve three main objectives:

1. to ensure that the maximum number of drivers observe police enforcing drink-driving regulations;
2. to test drivers for alcohol consumption;
3. to process those offenders detected driving over the prescribed BAC limit.

Traffic police can maximize the effect of the checkpoints through *(13)*:

- **making them highly visible**
  - ▹ Deploy many police officers and police vehicles. To this end it is important to have mobile units with the capacity to provide evidential testing and processing

of offenders at the site of interception. This gives the public the impression of a higher level of enforcement activity than is actually being delivered as the police may move their enforcement or checkpoint zone to different locations during a single shift. Having evidential testing equipment at the point of interceptions also avoids the resource drain and wasted time in having to transport suspected offenders to a police station for a confirmation test. Police should:
  - work in teams
  - operate at diverse locations
  - have day and night-time operations
  - use flashing warning lights to draw attention to the programme
  - set up checkpoints at interceptions
  - display a sign at the checkpoint indicating the reasons for the checkpoint (for example, "drink-driving enforcement"). This will not alert the drivers before they are checked but provide a strong message to all drivers going through the site or past the checkpoint.

- **rigorously enforcing drinking and driving laws to ensure credibility**
  - If the law is not enforced, drivers will not comply. They must be informed, persuaded about the legitimacy of the intervention and believe that this will improve their safety.
  - Everyone is equal – no exemptions, no bargaining, no special circumstances.
  - Always be polite, fair and firm when processing offenders.

- **setting up checkpoints as often as possible, over a long period**
  - Drivers must consistently see enforcement activities and consistently hear about anywhere, anytime.
  - The same enforcement strategy must be repeated often.
  - Conduct night-time blitzes involving teams of police officers working in well-lit, safe areas.
  - Where the law permits, continual random testing – every driver intercepted for any offence is tested.

In order to reduce the incidence of drinking and driving it is necessary to keep people guessing about the actual chances of detection. People who are uncertain about the real risks tend to over-estimate the chances of detection, which is important with limited enforcement resources. The four points above form the basis of an intervention strategy that can be highly successful in bringing about a general perception that drivers or riders can be tested **anywhere, anytime.**

Roadblock/checkpoint management

Intercepting moving vehicles in the flow of traffic for random or specific enforcement requires the utmost attention to planning and risk assessment.

The primary consideration when setting up a checkpoint or roadblock is the safety of police officers, suspected drink-drivers and other road users. No site should be in operation without a designated safety officer who has the responsibility of ensuring overall safety (this person may have other roles as well). Even where only two or three officers are operating, one officer should be the safety officer. Managing checkpoints includes:

1. Choosing a safe location

Selecting a safe location includes considering:

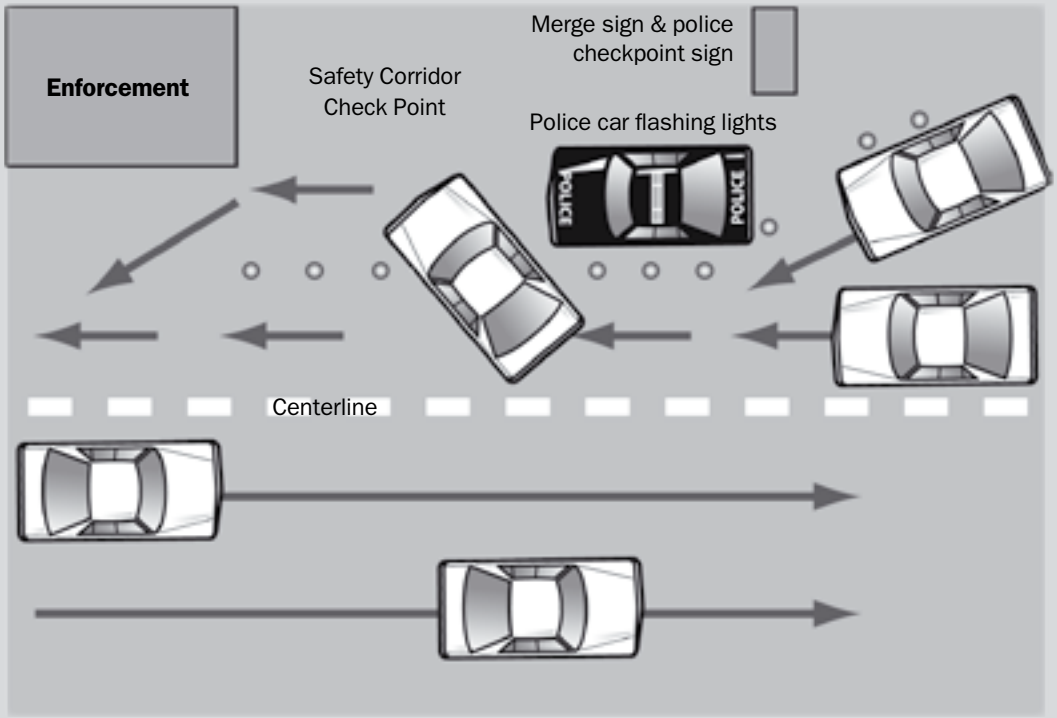
- locating the site where approaching drivers have sufficient time and visibility to adjust their driving in order to safely negotiate the checkpoint. If in doubt, choose another location;
- safety factors for officers when setting up and dismantling the site. Persistent bad weather can render a site impractical or unsafe;
- moving the site to a multiple locations during the course of the work period to maximise the visible police presence;
- sun glare for drivers approaching the site (the sun will change its position during the course of the day);
- visibility for motorists, which is of particular concern at dusk and dawn, so extra precautions should be taken if the operation is taking place over that period;
- locating night-time operations where there is effective illumination and providing additional lighting for high visibility;
- control of vehicles moving into the site as well as those vehicles passing it;
- the avoidance of unnecessary traffic congestion. Judgement as to what constitutes unreasonable congestion is subjective, but as a general rule, if you cannot see the end of the traffic in the distance, it is time to suspend testing operations and allow it to flow until you can.
- the use of natural barriers where traffic calming is achieved, e.g. toll gates.

2. Slowing traffic safely

On a two or three-lane carriageway, it is best to slow the traffic down using a funnel formation of delineation cones, a police checkpoint sign and a merge sign so that the selection and interception of vehicles can be done from a line of slow moving traffic rather than a high-speed one. A police car with flashing lights acts as a visible warning to approaching motorists and more importantly provides a safety corridor for officers to interview offending drivers. If the funnel method (see Figure 3.5) is chosen, be aware of the traffic volume both at the time of establishment and what could be expected later. Narrowing to one lane will automatically create congestion so those not selected must be moved through quickly.

This method may create advance notice that alcohol intervention enforcement is being undertaken. Suspected drink-drivers may take a number of evasive actions e.g. change positions with a passenger, abandon their vehicle, attempt to drive through

Figure 3.5 Funnel method of slowing traffic (○ = safety cone)



the checkpoint, turn left or right before the interception point, or carry out a U turn. For these reasons it is important to have an "intercept vehicle" strategically placed prior to the interception point to pick up drivers attempting to evade the checkpoint or roadblock. Sometimes the drivers attempting to evade the checkpoint are under the legal limit but traumatised by a guilty conscience.

A team approach to the management of checkpoints is particularly beneficial where only two or three police officers are operating, for example, at a set of traffic lights where there is a safe interception point just through the intersection. One officer may stand at the traffic lights and identify drivers who stop at the red light. They can be directed by that officer to his colleague(s) undertaking the alcohol intervention checkpoint. This system operates successfully at toll gates as well. It provides a mix of visible enforcement and warnings to motorists.

3. Choosing the right method to select vehicles

Methods include random and specific selection:

- **Random selection** can include directing the following vehicles into the site:
  - cars (at random)

  - every tenth vehicle (depending upon traffic flow)
  - five cars, then let the traffic continue to flow.

- **Specific selection** will depend upon intelligence gained about drinking patterns and collision data or prior history of alcohol consumption among sub-groups in the community and can include:
  - all vehicles
  - all taxi drivers or professional drivers
  - all vehicles of a particular type
  - all heavy vehicles.

4. Using equipment to ensure safety

Safety is paramount. The right equipment must be used properly to ensure the safety of traffic police officers and road users at all times.

- All members on site should wear reflective vests or jackets both day and night.
- All members must be in police uniform.
- Use police vehicles as traffic protection.
- Use marked police vehicles with lights flashing to maximise visibility (be conscious of the battery life with lights flashing and engine off).
- If there are any "official" observers, they should not be permitted on site without reflective vests.
- Equipment should include illuminated torches fitted with a red cone to provide a contrasting colour.
- Delineation of the site should be with strobe lighting and/or red safety cones.
- Consider if any of the surrounding equipment could be used as a safety barrier.
- Consider natural barriers or natural interception points e.g. toll gates, service stations, parking centres, entry/exits.
- Ensure there are sufficient police numbers for a safe, effective operation.
- Ensure the Operations Command Centre is aware of the site location.
- Consider photographic and/or video evidence.

5. Contingency planning

Ensure there is a process for dealing with:
- no licence
- no registration
- stolen vehicles
- intoxicated drivers
- refusal to stop at interception point.

While the majority of drivers will be compliant and not present any problems, there are others who may be argumentative, or who try to avoid being stopped – e.g. nervous drink-drivers or criminals.

6. Getting the message across

The most important aspect of this method of policing is to provide a deterrent to both those being checked and drivers who pass by unchecked. Drivers passing the site should be made aware of the purpose of the checkpoint by means of either a "variable message sign" or large fixed sign advising "Drinking and driving enforcement". It is highly important to have a message clearly visible.

If this is not done, other drivers may assume it is an ordinary police security check or other traffic checkpoint and no change to their attitude will occur.

7. Processing offenders quickly

If drivers are to be processed it should be undertaken with minimum delay to the driver. Observations should be clearly stated to the driver and corroboration from fellow officers sought if there is denial. Evidence should be recorded without argument or bargaining. Police must always be courteous and polite and maintain a high degree of skill and professionalism.

8. Meeting statistical requirements

The following information should be recorded:

- number of motor vehicles that passed the site (estimated by taking a number of sample counts during the operation and multiplying the numbers for the time at the location);
- number of offenders processed;
- number of police persons involved;
- number of hours worked at the location.

The most important aspect of any checkpoint or roadblock is the safety of the police officer, the safety of the citizens and the safety of the offenders or suspects.

The NHTSA has developed guidelines dealing specifically with low-staffed sobriety checkpoints (www.nhtsa.dot.gov/people/injury/enforce/LowStaffing_Checkpoints/images/LowStaffing.pdf). These checkpoints achieve the same results as conventional checkpoints but with fewer people. They are mobile, and typically they will not last as long as full-scale checkpoints.

BOX 3.7: **Establishing alcohol as "probable cause" of impairment, United States**

In countries such as the United States, traffic police are required to establish "probable cause" in order to stop a vehicle for a potential drinking and driving offence.The following list of symptoms, from a publication issued by the National Highway Traffic Safety Administration (DOT HS-805-711), is widely used in training officers to detect drunk drivers. After each symptom is a percentage figure which, according to NHTSA, indicates the chances that a driver is over the legal limit.

Turning with wide radius	65	Following too closely	45
Straddling center or lane marker	65	Tires on center or land marker	45
Appearing to be drunk	60	Braking erratically	45
Almost striking an object or vehicle	60	Driving into opposing or crossing traffic	45
Weaving	60	Signalling inconsistent with driving actions	40
Driving on other than a designated roadway	55	Stopping inappropriately (other than in lane)	35
Swerving	55	Turning abruptly or illegally	35
Slow speed (more than 10mph below limit)	50	Accelerating or decelerating rapidly	30
Stopping (without cause) in traffic lane	50	Headlights off	30
Drifting	50		

Probable cause to detain

The officer will typically approach the driver's window and ask some preliminary questions. The purpose is to detect the possible presence of such preliminary evidence as:

- an odor of alcohol on the driver's breath or in the car generally;
- slurred speech in response to questioning;
- bloodshot or reddish eyes;
- flushed face;
- difficulty in understanding and responding intelligently to questions;
- fumbling with driver's licence and registration;
- the plain-view presence of containers of alcoholic beverages in the vehicle.

If the officer observes enough to have a reasonable suspicion to legally justify a further detention and investigation, he will ask the driver to step out of the vehicle.

Field sobriety tests

The officer will administer one or more field sobriety tests (FSTs) if alcohol impairment is suspected. The most commonly administered FSTs include:

- walk-and-turn (heel-to-toe in a straight line);
- finger-to-nose (tip head back, eyes closed, touch the tip of nose with tip of index finger);
- modified-position-of-attention (feet together, head back, eyes closed for 30 seconds; also known as the Romberg test);
- one-leg-stand for 30 seconds;
- recite all or part of the alphabet;
- touch fingers of hand to thumb in both directions in rapid succession;
- horizontal gaze nystagmus (following an object with the eyes to determine characteristic pupil reaction);
- count backwards from a number such as 30 or 100;
- pick up a coin from the ground without bending down;
- breathe into a "preliminary breath test" device.

Probable cause to arrest

If the officer has sufficient facts justifying a reasonable suspicion that the suspect has been driving under the influence of alcohol, he will make the arrest, handcuff the suspect and transport him to the police station. En route, the officer may advise him of his rights and his legal implied consent to submit to an evidentiary chemical test of blood, breath or possibly urine.

Summary of ways to enforce drinking and driving laws

- Enforcement activities should be based on a sound understanding of the problem, supportive legislation, adequate training and equipment, and a strategic direction.
- Police intervention objectives should be casualty reductions, not apprehensions.
- Enforcement activities should be intelligence-led and expanded gradually.
- Random alcohol screening provides general deterrence while targeted enforcement serves to facilitate prosecution of drivers who refuse to stop drinking and driving.
- Both general deterrence and targeted enforcement activities should be employed in combination.
- Mobile alcohol screening units should have the capacity to provide evidential testing and to process offenders at the site.
- Ideally, at least 1 in 3 drivers will be screened every year.
- A range of mobile screening devices are available.
- Enforcement activities should be combined with publicity and public education to gain community acceptance.
- Enforcement activities should be highly visible, rigorously enforced, sustained over the long term and well publicised.

3.3.3 Punishments and sanctions for drinking and driving offences

Countries have adopted a diverse range of punishments and sanctions for drinking and driving offences. Drinking over the legal limit should be one of the most serious driving offences possible and the punishment should be suitably large, and culturally and economically appropriate.

Punishments and sanctions for drinking and driving offences that have been adopted in various countries include:

- Monetary fines, which may rise with multiple convictions, as BAC levels increase, or with the offender's income;
- Suspension or withdrawal of driving licence;
- Where crashes which result in a casualty occur, an drunk driver may be jailed for several years and/or have their driving licence permanently revoked (see Box 3.8)
- Less common and more controversial measures not discussed in detail this manual are vehicle sanctions such as licence plate impoundment and alcohol interlocks. Dealing with repeat offenders is handled in at the end of this section.

These final measures assume that a country has a well-developed system for vehicle registration and tracking recidivist drinking and driving offenders, which is not generally the case in low and middle-income countries, who are the primary target audience of this manual.

BOX 3.8: **Example punishments for drinking and driving offences**

Sri Lanka

The fine for drinking and driving was increased from Rs 2000 to Rs 7000 (a 350% increase). A second drinking and driving offence within a one year period results in a punishment of a night in custody and a suspension of the licence.

United States

All 50 states now have two statutory offences. The first is the traditional offence, variously called driving under the influence of alcohol (DUI), driving while intoxicated/impaired (DWI) or operating while intoxicated/impaired (OWI).

The various versions of "driving under the influence" generally constitute a misdemeanor (punishable by up to one year in jail). However, the offence may be elevated to a felony (punishable by a longer term in state prison) if the incident caused serious injury (felony DUI) or death (vehicular manslaughter or vehicular homicide), or if the defendant has a designated number of prior DUI convictions within a given time period (commonly, 3 prior convictions within 7 years). California, which is being followed by a growing number of states, now charges second-degree murder where the legal state of mind of malice exists – that is, where the defendant exhibited a grossly reckless indifference to the lives of others.

Severe punishment for drunk driving is already underway in the state of Ohio for DUI offenders convicted of aggravated vehicular homicide to qualify for capital punishment. The new laws are a result of groups of friends and family of drunk-driving victims engaging in active campaigns to get the same justice as victims of other forms of murder. The logic of these laws is that drunk driving is premeditated, and because aggravated vehicular homicide is a felony in both states, the act of killing someone in the commission of such a crime qualifies for a charge of felony murder in the first degree. However, it is unlikely that anyone would be executed due to constitutional issues regarding the Eighth Amendment. This penalty is in addition to the regular DUI and court charges.

Penalties for driving under the influence commonly include incarceration, fines, driver's licence suspension or revocation, mandatory attendance at DUI schools, community service, probation and, increasingly, installation of a breath-alcohol ignition interlock device.

Canada

Driving under the influence of alcohol is a generic term for a series of offences under the Canadian Criminal Code. The main offences are operating a motor vehicle while the ability to do so is impaired by alcohol or a drug, contrary to section 253(a) of the Canadian Criminal Code, and operating a motor vehicle while having a blood alcohol concentration of greater than 80 milligrams of alcohol in 100 millilitres of blood, contrary to section 253(b) of the Criminal Code. See Criminal Code Sections 253 to 259.

The minimum punishments for impaired driving are:
- for the first offence: $600 fine, one-year driving prohibition or time in jail;
- for the second offence: 14 days' jail, two-year driving prohibition; time in jail
- for the third or subsequent offence: 90 days' jail, 3-year driving prohibition.

On January 27, 2001, Andrey Knyazev, a Russian diplomat in Canada, killed a Canadian woman while drink-driving. He was imprisoned in Russia. This incident triggered a crackdown on drink-driving by diplomats in Canada.

United Kingdom

In the UK, drivers who exceed the prescribed limit (which is higher than in many other European countries) are very heavily punished. Offenders receive a 12-month disqualification from driving, a prison sentence and/or a fine of up to £5000. The same tariffs apply to both the offences of exceeding the prescribed limit or of being unfit to drive. However, a recent introduction will allow a driver to undergo a drink related rehabilitation course and on successful completion of the course part of the disqualification may be reduced by up to six months.

This "high limit – heavy punishment" model is somewhat unusual. Some countries impose a fine but not a loss of licence, and other countries, such as France, have a two-tier level of punishment. Drivers just over the limit receive a fine while those exceeding the limit by a large amount can lose their licence. There is, however, a concern that drivers who lose their licence may continue to drive.

Monetary fines

In many countries monetary fines are a common form of punishment for offenders (see Box 3.9). Fines must take account of local economic circumstances, and be seen as appropriate relative to fines for other offences in the traffic law. The aim is to create an effective deterrent.

BOX 3.9: **Penalties and fines for drinking and driving offences**

China

On May 31, 2004 the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China issued the GB19522 2004, in which the national standard for definitions of "drink-driving" and "drunk driving" were set up. According to the GB19522 2004, drivers with a BAC below 0.02 are sober, drivers with a BAC between 0.02 and 0.08 are driving under the influence (DUI) and those with a BAC in excess of 0.08 are driving while intoxicated (DWI). The technical indicators and capability of the BrAC tester should meet the requirements of the GA307 standard; and those of the BAC analyser should meet the GA/T105 standard. However there is no standard procedure to identify blood alcohol level and no description about how to detect alcohol.

The Road Traffic Law of PR China, published on May 1, 2004, indicates the punishment measures for drinking and driving. According to the 91st article of the law, the driving licence of drink-drivers will be suspended for a period from one month to three months, and the driver will be fined 500 Yuan. Drunk drivers will be restrained until awake by the department of traffic management at the public security sector. Furthermore, the driver will be put into custody for no more than 15 days and fined from 500 Yuan to 2000 Yuan, and the driving licence will be suspended for a period from three months to six months. The driving licence of commercial vehicle drink-drivers will be suspended for three months and the driver should pay a penalty of 500 Yuan. Drunk drivers will be restrained until awake by the department of traffic management at the public security sector. Furthermore, the driver will be put into custody for no more than 15 days, given a fine of 2000 Yuan and the driving licence will be suspended for a period for six months. Those who are punished more than twice because of drunk driving for the above two items of prescript will have their driving licence revoked, and be prohibited to drive commercial road vehicles in the next five years.

France

In August 1995, the BAC limit was lowered to 0.05 g/100 ml. Driving with a BAC of 0.05 to 0.08 g/100 ml results in a fine amounting to 756. If the offender has a BAC level of more than 0.08 g/100 ml, the maximum sentence is a fine of 4537 and a two-year jail sentence.

Malta

With a first offence, a minimum fine of Lm200 and/or three months' imprisonment is applied, and the offender's driving licence is suspended for six months. In the case of second offences, a minimum fine of Lm500 and/or six months imprisonment is applied, in addition to a one-year licence suspension.

Disqualification from driving

In theory, withdrawing a driving licence prevents the person from driving until the end of the disqualification period. In practice, many disqualified drivers continue to drive illegally, although perhaps not as much as previously. The effectiveness of this sanction will depend on the chances of the driver being stopped in any subsequent police check and their willingness to risk driving illegally. In considering the use of

this penalty, account should be taken of local enforcement capabilities, the administrative complexity of following up on driving licence offences, frequency of police checks and whether the sanction is already used for other traffic offences.

NOTE

Unlicensed driving in the United Kingdom

Research carried out for the Department for Transport estimated the scale of unlicensed driving. It found that approximately 0.5% of hours driven in the UK were by unlicensed drivers, but that they committed 9% of driving offences, and were involved in 4% of fatal crashes.

12% of drivers who had been disqualified from driving for drinking and driving offences admitted that they still drove illegally, while 39% of drivers who had been disqualified as a result of accumulated penalty points admitted that they drove illegally.

Vehicle sanctions

There is a diverse range of vehicle sanctions. In order for a country or region to use vehicle sanctions effectively as a part of a drinking and driving programme, the country must have a well-developed vehicle registration and tracking system in place. As the target audience of this manual is low and middle-income countries in the beginning stages of developing programmes to curb drinking and driving, interventions of this type are considered non-essential and not described in detail here.

- **Vehicle impoundment** has been used as a "last resort" option for repeat DWI offenders but there is little information available on the effectiveness of this measure.
- **Vehicle licence plate seizure** has been found to be effective when it can be undertaken by police at the time of the arrest. Fees are typically charged to obtain plates so this activity can be revenue neutral *(14)*.
- **Vehicle registration cancellation** – cancelling vehicle registration is likely to have limited applicability in low and middle-income countries unless registration rates are already high. Even where this is the case, vehicle registration cancellation is typically only applied in cases where the DWI offender is the sole driver of the vehicle.
- **Alcohol interlocks** – although probably not relevant to many low and middle-income countries at the moment, ignition locks are being used successfully in a small number of more developed countries primarily to prevent recidivist drinking and driving.

Dealing with repeat offenders

The issue of repeat offenders is not covered in great detail in this manual. This is because countries need well-developed data collection systems that enable repeat drinking and driving offenders to be identified and tracked, and this is generally not the case in the target audience countries for this manual.

In brief, the two main methods of dealing with repeat offenders in countries with advanced drinking and driving programmes are: **vehicle sanctions** and **rehabilitation programmes**. Vehicle sanctions have been briefly discussed in the previous section.

Rehabilitation programmes are diverse and their effectiveness is often unresearched. However, there is sufficient evidence to demonstrate that rehabilitation courses that follow good practice can be effective in reducing repeat offences, including *(14)*:

- **education-based programmes** that assume that lack of knowledge about alcohol and the risks of drinking and driving results in poor decision-making. While breaking the connection between drinking and driving is the main aim of such programmes, they may also have the benefit of encouraging participants to recognise a drinking problem and consider alternatives to drinking and driving while over the legal BAC limit.
- **psychotherapy or counselling-based programmes**, directed mostly to individuals with signs of alcohol dependence or addiction. They are generally focused on reducing alcohol consumption. However, these programmes may fail to address drinking and driving.
- **combined programmes** that recognise that the problems are a combination of crash risk and alcohol misuse. Education sessions are often used to address knowledge about the risks of drink-driving, while individual counselling tackles issues related to individual alcohol misuse.

Researchers *(15)* report that rehabilitation programmes reduced drinking and driving recidivism by 7–9%. Shorter follow-up periods resulted in greater variability in effect size. A number of characteristics were common to successful programmes, including that they:

- targeted high-risk groups;
- were based in the community rather than a single institution;
- had a focus on both behavioural and cognitive factors;
- had clear objectives and content;
- had a directive treatment style;
- were delivered exactly as designed.

3.4 Social marketing and public education

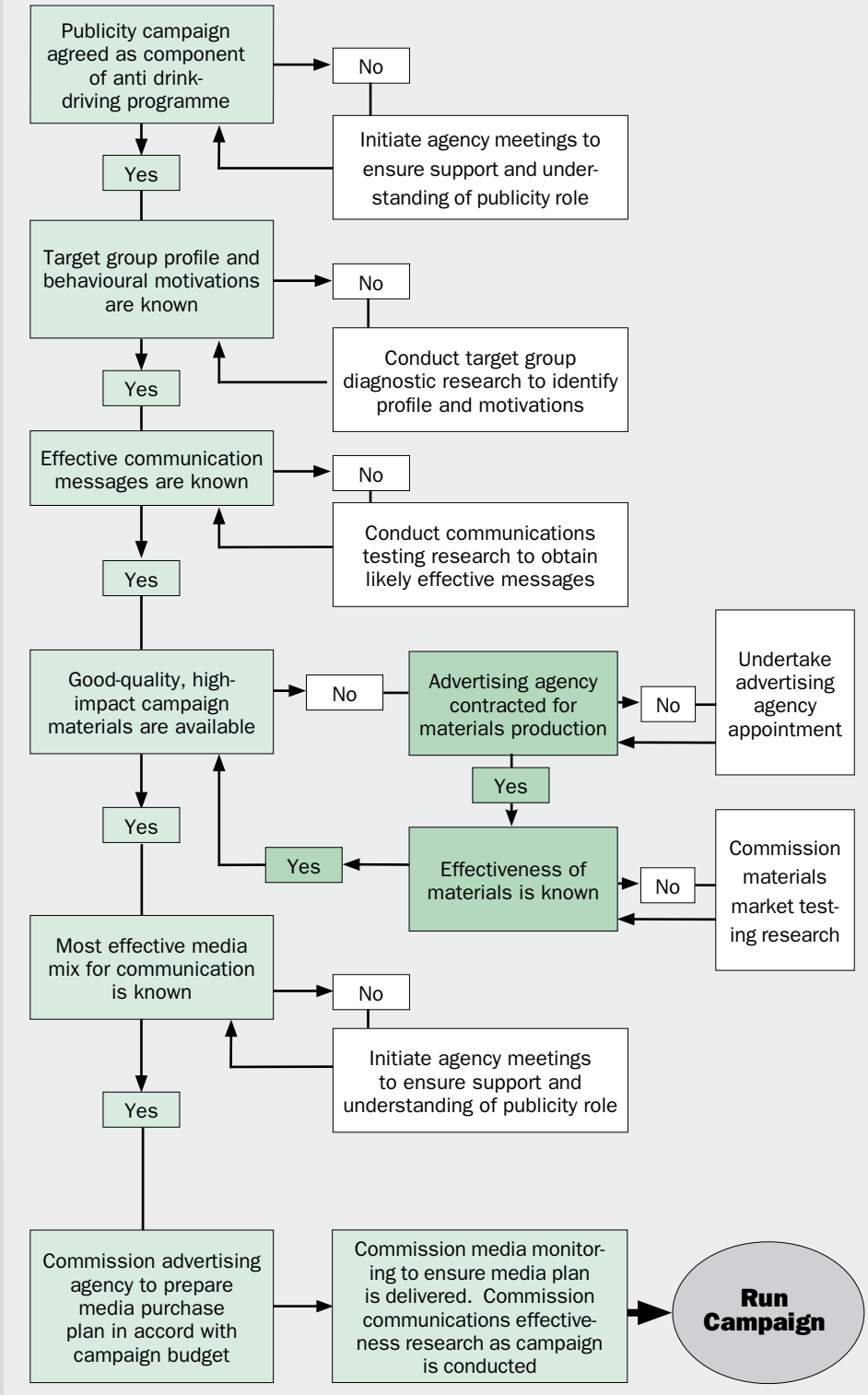
Public education has an important role to play in road safety, but it is not the only approach that should be employed. Road safety publicity is used most successfully as a support to other initiatives, rather than being the lead initiative.

Publicity works to advise people of things they might not know, to reinforce things they already know but might forget, and to encourage behaviour that people may not want to undertake. It generally supports the more powerful influences of law enforcement, legislative amendment, driver management arrangements (such as licensing) and engineering changes which typically lead to an effective road safety programme.

Public education is particularly important in cases where new laws are being introduced, or serious enforcement is planned of existing laws that are currently disregarded. This is needed to give legitimacy to the law and enforcement action, and it also provides a basis for influencing communtiy reactions to the law and its enforcement. In such cases a staged programme of information and enforcement should be used.

Figure 3.6 depicts a simplified version of the process that should be undertaken in developing a publicity campaign to reduce drinking and driving.

Figure 3.6 **Steps involved in a drinking and driving publicity campaign**



3.4.1 How to raise public awareness and change attitudes through a mass media campaign

A mass media campaign can be an effective tool to educate the public about the risks of drinking and driving. The most effective road safety campaigns have been those that achieve a change in behaviour. It is of course also important to increase awareness and improve attitudes, but lives are actually saved when the desired behaviour patterns are adopted.

New forms of behaviour can often be best achieved when legislation is backed up by enforcement and information. When strong legislation is in place, it is much easier to persuade people of the value of not drinking and driving. Issuing penalties can even be held back in the early stages while people realize that the rules are being enforced.

Conducting a mass media campaign requires expertise in marketing or advertising, development of specific campaign objectives, articulation of the campaign messages and the target audience, specifying a timeframe for implementation, and a methodology for evaluating this initiative.

Selecting an agency for the campaign

A successful campaign may be carried out by qualified personnel within a government department, but usually needs the expertise of a professional marketing or advertising agency. Overall control of the campaign should, however, stay with the government agency responsible. The campaign may also require the services of a public relations or advertising agency and a research agency, unless the government agency can provide these services itself.

The first step in selecting an agency is to issue a tendering document, outlining the overall aims and objectives of the campaign, the time schedule and the budget. From their initial applications, a shortlist of agencies should be drawn up, based on:

- the agencies' previous experience with social marketing campaigns;
- their creative ability;
- their physical location;
- their media purchasing ability;
- their size.

These agencies are then asked to tender for the work, by providing creative ideas, plans for media work and budgets.

Setting objectives for the campaign

The most important aspect of any campaign is to have a clear idea of what the campaign is meant to achieve. The objectives may be stated in quantifiable terms. For instance, the public might be told that "by date X a BAC law of 0.05 will be introduced".

The assumptions for the campaign are that drink-driving is a problem and that the enforcement of any current legislation is not intense enough.

At an early stage it will be necessary to define (and then refine) the objectives of any campaign or campaigns. Within the context of drinking and driving a campaign could be conducted for a number of reasons. For example, it may strive to:

- inform the public of new legislation;
- tell the public about increasing enforcement activity;
- educate road users about the crash risk associated with consuming any alcohol;
- quantify the (personal) risks of driving while over the legal BAC limit;
- warn about social consequences to other ("innocent") parties;
- point out the risk of detection;
- emphasise the social unacceptability of certain behaviours;
- warn about the wide-ranging consequences of being detected.

It is important to specify the campaign objective or objectives from the outset so that the campaign can be properly planned and conducted – but also so that an appropriate evaluation can be planned and implemented as part of the campaign.

This would normally be done in discussion with an advertising agency selected to prepare the campaign materials.

Each of these objectives should be quantifiable. It is therefore necessary first to ascertain:

- the current level of awareness of the dangers of drinking and driving;
- the current level of compliance with any legislation in place;
- the current level of enforcement.

BOX 3.10: **Targeting summer drink-driving, United Kingdom**

At first the UK's drink-drive campaigns focused on drinking during the Christmas period. This was eventually extended to target summer drinking and driving, and to deliver messages to an audience of potential drink-drivers at crucial decision-making moments. The primary target was 17–29 year old males – drink-drivers, not drunk drivers.

The key objectives of the campaign were:

- to increase awareness of the dangers of having a couple of drinks and driving;
- to educate drivers that they can't calculate their alcohol limit;
- to shake drivers' confidence in their own "rules of thumb" for what is "safe" to drink
- before driving;
- to get drivers to think about the consequences of being caught.

The key messages were:

- it takes less than you might think to become a drink-driver;
- you can't calculate your alcohol limit;
- don't drink and drive.

More information: *www.thinkroadsafety.gov.uk/campaigns/drinkdrive/drinkdrive.htm*

Creating campaign messages

No campaign will be effective unless it identifies and develops the appropriate message or messages. There is no easy formula for determining the correct message; therefore working with skilled professionals is critical to campaign success.

Messages should target known behaviour (e.g. drinking after work and then driving), focus on known risk groups (e.g. young men) and never suggest that drinking and driving is acceptable under certain circumstances (e.g. during national holidays, or at wedding celebrations) since this leads to confusion about what is and is not acceptable.

One of the problems with addressing road safety issues is that the target audience often does not see the benefits of changing their behaviour. People are naturally resistant to change, and will often look for an excuse to dismiss the message. It is therefore important not to provide individuals with such excuses, e.g. if people see the message as being irrelevant to them ("it's meant for older people, not my age group").

Figure 3.7 **Billboard used as part of a drinking and driving campaign in Namibia**

Market research is used to determine peoples' knowledge of legislation as well as the opinions, beliefs, fears and motivations of high-risk groups that are known to be involved in drink-drive crashes. A first step in this process is to identify the target groups involved and then collect information from them that is relevant for the campaign.

1. Diagnostic testing

The first step in developing campaign messages is to assemble a small group of individuals representing your main target group. Ideally these individuals will have been charged with a drinking and driving offence. The goal of discussions is to:

- identify and understand why these individuals drink and drive *(e.g. they don't understand the road safety risks involved, they are not familiar with the effect of alcohol on their ability to drive safely, they don't think they will be caught);*
- understand the motivations that might be used to change the alcohol consumption and driving behaviour of the target group;

2. Develop campaign messages and materials

On the basis of the information you receive from the diagnostic testing with your target group, a range of messages and campaign materials are developed to encourage a change in thinking and behaviour in relation to drinking and driving *(e.g. don't drink and drive – your family is waiting for you at home)*. Preparation of these products is commonly undertaken by advertising agencies contracted by the road safety authorities.

The draft campaign messages and materials should then be tested with small groups of individuals representing the target group by an independent market research agency contracted for this purpose. *The agency that created the materials must not be allowed to market-test their own materials – they are unlikely to be self critical.* The purpose of testing the materials is to determine the most effective message and method for communicating to the target group, and changing their perception and behaviour in relation to drinking and driving.

3.4.2 Getting the campaign message to the target audience

The messages and materials you develop for the campaign can be publicised and disseminated through a wide variety of media that your diagnostic research shows will be most effective in reaching the target audience.

Road safety publicity includes a range of activities designed to inform, advise, encourage and persuade the target audience to undertake a particular behaviour. A publicity campaign itself is made up of a range of individual activities, one of which is usually advertising.

Road safety advertising is usually the most visible part of a campaign, and often is mistaken for the whole campaign itself. A typical campaign could incorporate the components outlined in Table 3.8. A campaign that is undertaken only once – even if it includes dedicated enforcement – will not have a long-term sustainable impact on reducing drinking and driving; regular enforcement accompanied by a repitition of the key messages is needed.

The target audience must interpret campaign messages as relevant to them, as with the poster (see Figure 3.8) from Papua New Guinea.

Advertising alone is unlikely to reduce road crashes involving drinking and driving. It should be seen as one element of a wider campaign involving enforcement, legislation, engineering and other measures. However, there is general agreement among practitioners that "mass media" publicity is an essential and long-term part of any strategy to reduce the number of people killed and injured on roads as a result of drinking and driving.

Figure 3.8 **Making the message relevant – a poster campaign from Papua New Guinea**

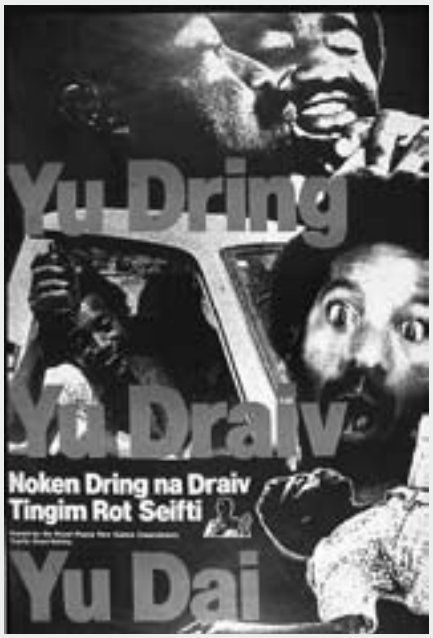


Table 3.8 Publicity campaign components

Campaign component	Reason for considering
Television advertising	Large target audience reach. Communicate short key message. Visual and aural communication. Not good for detailed messages.
Radio advertising	Large target audience reach. Short message. Message while driving through car radio. Aural communication.
Press advertising	Large target audience reach. Short message. Use as link to media public relations stories. Limited by literacy levels of audience. Can be basis of word-of-mouth communication.
Outdoor advertising, e.g. road signs, taxis, police vehicles, buses	Short message targeting the audience while using the road. Can reach a range of road users. Can reinforce and extend TV and press images.
A project launch event	Broad public awareness, government exposure, free media exposure. Opportunity for two-way communication at media briefing. Can form the basis of word-of-mouth communication.
A series of public relations activities	More detailed explanations of initiative. In-depth analysis. Public credibility. Exposure for campaign figureheads. Can be linked to public events and community meetings. Provides opportunity for local participation and to "localize" campaign messages.
Media interviews, presentations and articles	Detailed explanations of initiative. Public credibility. Exposure for campaign figureheads. Opportunity for two-way communication.
A kit of activities to be undertaken in regional or local areas	Support for regional contributions, support for regional media and public relations activities. Opportunity to localize the issues. Potential to profile local figureheads. Basis of information for public or village meetings.
Activities designed and funded to operate in local communities	Provide information to support continuing local media coverage. Can establish local ownership of issues and support action at local levels.
Sponsorship of sporting and cultural events	Good for campaign positioning and branding. Can access high-profile and highly credible personnel. Link with specific road safety issue can be tenuous unless properly thought out.
Publicity for the enforcement activities undertaken	Enhance deterrent effect to generate short-term behaviour change. Powerful influence on immediate behaviour provided enforcement level is sufficient to be acknowledged by the public.
Interview key figures: police, celebrities and religious leaders	Exposure for campaign figureheads. Campaign credibility. Opportunity for two-way communication.
Community or school-based promotional events	Enhance public/target group interest. Opportunity for positive behaviour reinforcement. Link to school curriculum teaching on road safety for children. Opportunity for parents' road behaviour to be influenced through their children. May be a weak influence if community culture does not support assertive children's behaviour.

BOX 3.11: **THINK! An integrated publicity campaign, United Kingdom**

The UK's THINK! campaign television advert, "Crash", was launched in 2004. It warned that it takes less than you think for your driving to be impaired by drinking alcohol, and supported the strategy of "just saying no".

The advert shows three men meeting after work for a quiet drink. One of the men gets in a second round, and our "hero" tries to decline because he is driving. However, he quickly gives in, thinking, "after all it's only two". The advert dramatises that exact moment of decision-making and shows the consequences of that second drink. It also raises the idea that you become a drink-driver in the pub, not on the road.

A radio advert, leaflet and posters were developed as part of an integrated campaign. The national radio advert focuses on the moment in a pub when we decide to stay for that extra drink – or not.

The leaflet and posters support the TV and radio adverts by reinforcing the message that it is impossible to calculate your alcohol limit, so you shouldn't risk guessing.

More information: *www.thinkroadsafety.gov.uk/campaigns/drinkdrive/drinkdrive.htm*

Timeline of publicity campaign relative to law and enforcement activity

The timing of a drinking and driving publicity campaign in respect to related activities such as changes in the law and police enforcement is an important factor in the overall success of changing road user behaviour. Coordination among the initiatives is critical.

Typically people are more prepared to change their behaviour if it means that they are complying with the law rather than simply being urged to do something because "it makes sense". An example of this is the experience of the United Kingdom in relation to seat-belt wearing. After many years of "persuasive" advertising that produced only limited behaviour change, the law was changed to make seat-belt use compulsory. As a result of this change in legislation, wearing rates in the UK went from being one of the lowest in Europe to the highest.

Similarly it is important to publicise, either by campaigns or mass media coverage, any changes in (typically more or tougher) enforcement activity. Visible and frequent enforcement is critical in persuading the general public to obey drinking and driving laws, and not just to catch those breaking them. Enforcement works because it acts as a deterrent. Thus, informing the public about enforcement activities can deter people from drinking and driving by increasing their perception of being caught.

Long-term and sustainable changes in public perception and driver behaviour, especially in relation to behaviour such as drinking and driving, are not generally achieved easily or quickly. This means that a timeframe of years rather than months should be anticipated.

Monitoring public perspectives

Prevailing community views about risk and the morality of some types of behaviour (such as drinking and driving), and the level of control over daily activities that people are prepared to accept, all influence which countermeasures are likely to be acceptable, what messages will be understood and accepted, and what barriers to change exist in the community. For these reasons, monitoring public perspectives is an important "back room" activity which must be undertaken regularly. In addition, the lessons learned from monitoring and evaluation activities are critical to improving the quality and impact of future campaigns.

Monitoring can be both formal and informal in nature, and does not necessarily require extensive funding to undertake. Some approaches could include:

- **public opinion surveys**
  Formal surveys undertaken regularly using the same or very similar questions each time can be implemented. Maintaining the same questions for a number of surveys allows a trend to be established on public views.
- **media monitoring**
  Information on issues discussed on talk-back radio, presented in television programmes, provided in letters to editors or leading articles in newspapers are all potential sources. However, in countries where media is strongly controlled, this method may not provide the access to real public views which is sought, and a combination of other methods may need to be employed.
- **surveying stakeholder views**
  For crashes involving drinking and driving, key stakeholders may have continued contact with the public, and their perspectives on public opinion can also be tapped. Stakeholders include NGOs, the alcohol industry, breath testing equipment industry, health authorities, medical professionals, licensed premises, restaurant owners and reception and events agencies.

There are many examples of large "community attitudes" surveys that have been used to glean pubic opinion on several aspects of driving, including drink-driving *(16)*. These include the Community Attitude Survey (Australia), the National Survey of Drinking and Driving Attitudes and Behaviour (USA) and Social Attitudes to Road Traffic Risk in Europe (SARTRE).

Summary of social marketing and public information campaigns

Social marketing and public education on drinking and driving are important elements of any programme to reduce the incidence of drinking and driving.

- The most effective drinking and driving campaigns include social marketing and education to increase public knowledge about legislation, particularly when changes in the law have been made, and to inform the public about increased enforcement.

- The objectives and the target group of the mass media campaign should be clearly stated.
- Advertising and public relations specialists should be employed to create targeted campaign messages and materials.
- All campaign messages and materials should be market tested.
- A mass media campaign on drinking and driving should involve a range media, of which advertising is only one.
- A mass media campaign on drinking and driving should be planned in close coordination with legislative changes and increased enforcement activities in order to inform the public of changes and deter drinking and driving
- The effects of the mass media element of the drinking and driving campaign on the opinions and behaviour of road users should be closely monitored and evaluated. The lessons learned through the monitoring and evaluation activities should be used to improve the quality and impact of future campaigns.

The World Bank provides information on issues to consider in planning a campaign *(17)*. Additional information on designing road safety campaigns is also available *(18)*.

3.5 Community-based interventions

Drinking and driving interventions that are undertaken by and involve the local community can be an effective means of both educating the public about the risks involved in drinking and driving and preventing it from taking place. These kinds of interventions are highly diverse and many are not evaluated. The interventions can range from the activities of non-governmental organizations, created specifically to prevent drinking and driving (such as Mothers Against Drunk Driving (MADD) – see section 3.2) to programmes undertaken by employers, schools, outlets selling beverage alcohol (e.g. server training), and designated driver programmes.

Responsible employers

Increasingly, responsible employers with large fleets and many drivers impose internal regulations on their staff that are designed to improve road safety. This is both socially responsible, and often a financial benefit to employers whose staff are costly to train and have responsibility for expensive vehicles, valuable and sometimes dangerous cargo as well as the lives of others. An absolute ban on drinking and driving – effectively a zero BAC level – is used by many. Breaking such internal safety regulations can result in dismissal.

The proportion of vehicles that are professionally driven is often high in low and middle-income countries. Working with fleet operators to embed mandatory or voluntary regulations and rules within their conditions of employment can be an effective strategy.

Many international transport companies, in particular those involved in the transport of hazardous goods, have strict policies banning alcohol from the workplace and prohibiting drinking and driving.

BOX 3.12: **Commercial drivers and road crash injuries, Ghana**

In 1999, a survey estimated the proportion of road crash injuries that involved commercial vehicles in Ghana *(19)*. The knowledge, attitude, and practices of commercial drivers in relation to road safety were also evaluated using a community-based survey and focus group discussions.

The survey revealed that of 122 crashes reported for the preceding year, 81% involved commercial vehicles, principally buses (40%) and taxis (24%). The involvement of commercial vehicles was the same for both motor vehicle crashes (81%) and pedestrian injuries (82%). However, injuries to children involving motor vehicles were especially likely to involve commercial vehicles (95%), in comparison with adults (79%). The focus groups revealed that most commercial vehicle drivers believed actions could be taken to lower the risk of crashes, including avoiding alcohol. However, this knowledge was not fully implemented *(19)*.

Workplace alcohol prevention programme and activity (WAPPA), India

A workplace alcohol prevention programme and activity (WAPPA) has been instituted by the Karnartaka State Road Transport Corporation (KRSTC) as a major contribution to road safety improvement in the state. KRSTC is responsible for provision of bus-based services in the south of the state and for all interstate and intercity coach services.

The project objectives include improved worker welfare, increased productivity, and accident prevention in the workplace.

The programme includes prevention and treatment components. Education and training to combat drinking and driving are provided, and alcohol consumption is prohibited within the workplace – a policy that applies to all employees and managers, not just drivers. In the next phase of the programme, the use of breath analysis machines in depots is planned for testing drivers prior to shifts.

Treatment at the company's expense is provided for first-time offenders against the policy, Second-time offenders are required to attend at their own cost, and third-time offenders are subject to severe disciplinary action, including possible dismissal

Strategies under the programme are grouped into three "zones" – red, amber and green. There is an individual employee focus in red zone activities, building towards more organization-wide strategies in the green zone.

Corporate evaluations claim a reduction in crash rates of more than 20% between 1997 and 2000, with additional corporate productivity and profitability benefits.

Designated driver and ride service programmes

A **designated driver** is an individual within a group of people drinking alcohol at an event/establishment who promises to remain sober in order to drive the others home afterwards. In some countries, designated drivers are offered complimentary non-alcoholic drinks by proprietors to encourage the safe travel of their customers after spending time at their establishment.

BOX 3.13: **The BOB campaign, Belgium**

The BOB campaign started in Belgium in 1995 with the aim of raising awareness of the dangers of drinking and driving. Most importantly, it highlighted the benefits of having a designated driver.

The campaign involves several governmental departments, the police and a private sector company. Alongside general information about drinking and driving, the campaign provides for increased police surveillance, especially during the weeks running up to Christmas and New Year.

Within few weeks of its launch in 1995, 4 out of 5 Belgians had heard about BOB. Now, 97% of the Belgian population knows about the campaign, and BOB has become the definitive symbol for combating drink-driving.

The concept has been picked up in several other European countries including the Netherlands, Luxemburg, France and Greece, with each country adapting the formula to its own needs.

To date, more than 37% of all drivers in Belgium claim to have offered to be a designated driver, 34% have been a designated driver and 46% have been driven home safely by one.

According to official figures, the BOB campaign has triggered a change in attitude. Today, 80% of the population considers drinking and driving unacceptable.

Ride service programmes provide transport for people who have consumed alcohol and may otherwise drive.

Numerous ride service businesses have started up across the United States to help address the problem of drinking and driving. NightRiders Incorporated was the first such service. The business employed drivers equipped with collapsible, motorized scooters. The drivers drove customers home in their own vehicles, stowing the scooters in the customer's trunk. Upon arrival at the customer's destination, the driver collected the fare, assembled the scooter, and rode off to the next customer.

Server responsibilities

In some jurisdictions retailers are liable for injuries caused by intoxicated adults or by minors to whom they sold alcohol. In some cases this liability extends to injuries caused by the intoxicated person to themselves. The available evidence suggests that legislation of this sort can significantly reduce crashes involving drinking and driving *(20)*.

Responsible beverage service and sales legislation is generally aimed at reducing sales of alcohol to minors and to intoxicated people. Responsible beverage service and sales legislation can apply to premises which sell alcohol to be consumed on-site or off-site and should comprise policies that promote:

- alcohol servers being at least 21 years of age;
- outlet staff awareness of legal responsibility;
- staff awareness of outlet policies and of consequences for violating these;
- the checking of age of all patrons appearing to be under 30 years of age;
- guidelines and training as to what constitutes acceptable serving practice;
- retailer-initiated compliance checks and enforcement *(21)*.

It is difficult to draw conclusions about the effectiveness of responsible beverage service and sales legislation in general because of the huge variation in the content of existing examples.

A common component of a "responsible serving programme" is to request a potential customer to produce a recognised form of identification in order to prevent underage drinking. Servers at premises selling alcohol should be educated about responsible drinking, should discourage binge drinking and avoid drink promotion offers (such as free drinks, happy hours or drinking competitions) which often encourage excessive alcohol consumption. Servers should be trained to advise their customers not drive after drinking. The licensee should ensure that a variety of soft drinks are readily available to customers preferring not to consume alcoholic beverages.

3.6 Engineering countermeasures

Enforcement and education are typically emphasised where addressing the issue of drinking and driving, but some engineering treatments are likely to be especially valuable in preventing crashes involving alcohol too.

Drivers/riders

The majority of road engineering treatments that will help reduce drink-driving related injuries fall into two groups. The **reduction of roadside hazards** will reduce the severity of crashes, while **enhanced information presentation** in the traffic system will help reduce the risk of a crash occurring in the first place.

Reducing roadside hazards

A high proportion of crashes involving drinking and driving are "run-off road" crashes. Such crashes will be more severe if they result in a collision with fixed roadside objects such as trees or electricity poles. As such, action to relocate, guard, or remove fixed roadside objects where drink-driving crashes are likely to occur should have a positive impact on the severity of these crashes.

Enhanced information presentation in the traffic system

Visual, perceptual and cognitive skills are adversely affected by alcohol and it therefore follows that providing information in a clear and easy to understand manner will be important in maximising the performance (and thus minimising the crash risk) of drunk drivers.

Some elements that may enhance information provision include improved guidance around curves and audio-tactile edge lining. Australian field experiments *(22)* revealed that of nine roadway delineation treatments trialled by drivers with BAC of 0.05, the most beneficial form of delineation was chevron alignment signs. These were shown to help drivers negotiate curves. In addition, the use of a wide edge-line tended to reduce the extreme lane positioning common among drink-drivers. Consequently, the "optimum" delineation treatment appeared to be one which combines chevron alignment signs with a wide edge-line.

It is also important, given the dulled cognitive and physical functioning of drunk drivers, to ensure that road geometry and delineation are kept as consistent as possible.

Pedestrians

While alcohol-impaired pedestrians are not a main focus of this manual, this road user group is at high risk of injury and death in road crashes, particularly in low and middle-income countries. For this reason, a few measures are provided below that have proven effective in reducing the incidence of road crashes involving all pedestrians.

Lower speed limits

Lower speed limits have the potential to improve safety for alcohol-impaired pedestrians in a number of ways. Gaps in traffic traveling at lower speeds are easier to judge for alcohol-impaired pedestrians. Drivers traveling at lower speeds have greater ability to avoid a collision with a pedestrian, and, in the event of a collision, the severity of the injury will be reduced.

Pedestrian fencing

Pedestrian fencing may be useful for improving the safety of alcohol-impaired pedestrians, as it requires no decision-making by the pedestrian. It may be particularly appropriate at locations where such pedestrians are likely to spill out onto the road or cross the road at an inappropriate point, for example, outside licensed premises.

Refuge islands and medians

Refuge islands and medians can assist alcohol-impaired pedestrians in crossing the road by allowing a staged crossing and simplifying the decision-making task. Kerb extensions can also improve the safety of alcohol-impaired pedestrians by reducing the crossing distance and the area in which the pedestrian is at risk. While such treatments usually attract pedestrians to cross where they are located, alcohol-impaired pedestrians are probably less likely to detour from their desired line of walking to use the facilities. The effectiveness of refuge islands and kerb extensions for alcohol-impaired pedestrians may therefore depend on their being located where such pedestrians would be likely to cross anyway.

Lighting

Since most crashes involving alcohol-impaired pedestrians occur at night, improved street lighting is likely to have a major impact on this type of event. Improved lighting has obvious implications for the safety of alcohol-impaired pedestrians by increasing their visibility to motorists. It also has less obvious implications in terms of attracting intoxicated pedestrians to designated crossing places, and lessening the risk of trips or falls. Although relatively costly, lighting can, in some circumstances, be paid for by the private sector and brings with it a number of social benefits.

NOTE

Street lighting project, Whiteriver, Arizona, United States

One street lighting project aimed to reduce pedestrian injuries – especially alcohol-related ones – in a Native American jurisdiction in Arizona *(23)*. In the five years prior to the additional street lighting, 15 pedestrian crashes had occurred along the 1.8 km target section of highway. In the five years after their installation only three crashes occurred.

Cost-benefit analysis revealed that the installation of the 28 street lights along the length of highway was followed by an average reduction of 2.5 pedestrian crashes per year, and a benefit-cost ratio of 10.

Crosswalks

The safety of unsignalled crossings and of crosswalks for alcohol-impaired pedestrians is also questionable. Alcohol-impaired pedestrians are less likely to detour from their desired line of walking to use the crossing facility and crossing in the roadway adjacent to the crosswalk may actually increase their risk. However, alcohol-impaired pedestrians who do cross on the crosswalk do not need to make gap selections as the onus is on the driver to give way to the pedestrian.

Pedestrian signals at traffic signals

Crossing the road at pedestrian and traffic signals simplifies the task of crossing the road by removing the need to make gap selection. However, alcohol-impaired pedestrians still need to make the choice to use the crossing to be able to push the button to operate the pedestrian signal, and wait for the walk signal.

3.7 Ensuring an appropriate medical response

3.7.1 Organization and planning of trauma care systems

The primary prevention of death and injury caused by drinking and driving is an overriding priority. However, if a crash occurs, many lives can also be saved through proper trauma care. This is especially the case in developing countries, where there are high fatality rates from potentially repairable injuries.

3.7.2 Crash-site care of alcohol-impaired casualties

Emergency workers advise that drink-drivers injured in a road crash generally create additional risks and problems for rescue and medical services.

Notwithstanding an excessive consumption of alcohol, patients are deserving of good medical care. This should be undertaken in a professional and non-judgmental manner. Patients should be assessed for signs and symptoms of alcohol use in conjunction with the normal injury diagnosis or trauma survey. Medical treatment of people involved in road crashes is made more difficult if they are alcohol impaired. For example:

Scene management

- Alcohol-impaired patients tend to be more aggressive, non-compliant and difficult to manage.

- Where they are mobile they may get in the way of rescue personnel trying to assist other injured patients in the vehicles.
- In extreme circumstances, it may be necessary for medical staff to withdraw from the immediate scene and allow police to regain control of the situation.

Patient assessment/treatment diagnosis

- Alcohol can reduce the response to pain which is critical for determining spinal injuries and suspected head injuries.
- As alcohol intoxication produces a neurological impairment, it is often impossible to clinically exclude a significant head or spinal injury, resulting in otherwise unnecessary investigations or prolonged hospital assessments.
- Alcohol can affect accurate history and assessment e.g. reporting of high blood pressure, allergies, medication, drug taking and diabetes may also affect the physiological signs.

Injury aggravation

- There is the increased possibility of further self-injury where alcohol-impaired patients do not have full control of their actions. Serious injuries may be made worse. This includes risk of spinal injury in the context of unstable vertebral fractures, where intoxicated patients may not comply with instructions to remain still.
- There is a tendency not to remain still or calm during normal treatment.
- There is potential for the patient to vomit.

Although not a medical issue, patients are more likely to refuse a breath test at the scene or blood test in hospital in an attempt to side-step the evidentiary requirements of legislation. Penalties for refusing a breath and/or blood test should cover these circumstances and be clearly contained within the legislation. For countries where compulsory blood tests are not taken in hospital, both law enforcement officers and medical staff must be aware that some drink-drivers will exaggerate or fake injury from a collision to seek the refuge of a hospital or medical services to avoid arrest or prosecution.

It is important to appreciate the problems which can be confronted by health professionals and rescue workers. Policy and procedures must clearly describe the processes and authorizations necessary to ensure the delivery of effective medical treatment and safe transportation. Training for dealing with alcohol-impaired patients can be included in regular training for dealing with aggressive or violent individuals.

BOX 3.14: **Ensuring that the emergency medical services are prepared**

Setting up an EMS system may not be feasible for many countries, but alternative pre-hospital care arrangements can be developed.

Trauma care, in both pre-hospital and hospital settings, requires speedy and appropriate action by trained personnel, with proper supplies and equipment. Improving trauma systems has been shown to lower the mortality in all treated trauma patients by between 15% and 20%, and to cut the number of preventable deaths by more than 50%.

Several recent publications provide technical details of on how to improve trauma care. Two, published by WHO, are strongly recommended: *Guidelines for essential trauma care (24)* and *Pre-hospital trauma care systems (25).*

Pre-hospital care

The pre-hospital stage is an important one to target in efforts to cut the number of road traffic deaths. The care given will depend on the services that exist.

Situations where no formal emergency medical service exists
A "formal" system of emergency medical services (EMS) is usually one with ambulances and trained personnel, who work in an agency with some supervision and with a network of communications. Where no formal EMS exists, governments should make alternative arrangements to provide pre-hospital care. Ways can be found to build on existing, informal systems and harness community resources, such as training members of the public in basic first aid. Setting up formal EMS systems in urban areas and along major inter-urban roadways should also be explored. Cost should be one consideration, given the high cost of these systems.

Strengthening existing EMS systems
Many EMS systems could be strengthened in a number of ways, for example, by establishing a regulatory agency to promote minimum standards for the delivery of prompt, quality and equitable pre-hospital care. They can also be strengthened by streamlining communication between sites where calls are received (such as alarm centres) and the sites of ambulance dispatch, as well as between different ambulance services; and by keeping good records on people cared for by the EMS, so as to monitor and improve the quality of care.

Essential trauma care

Improvements in trauma care need not necessarily involve high-cost, high-technology equipment. Much can be accomplished in an affordable and sustainable way through better planning and organization.

The essential trauma care services and the resources required for them can be promoted in several ways, including through needs assessments of trauma care requirements, through training in trauma care provided in appropriate educational settings, through quality improvement programmes that consider the entire trauma facility setting, and through the inspection of trauma facilities *(24).*

Rehabilitation

Many of those who survive injury go on to develop physical disabilities that limit their physical functions. Tragically, many of these consequences are avoidable and can be reduced through better rehabilitation services. Rehabilitation services are an essential element of trauma care, and can be improved by conducting in-depth needs assessments for injury-related rehabilitation and by strengthening national rehabilitation programmes. They can also be improved by incorporating the recommendations of World Health Assembly Resolution WHA58.23 and the recommendations on rehabilitation in the *Guidelines for Essential Trauma Care (24)* into a country's health policy.

Summary

- In combating crashes involving drinking and driving it is essential to adopt a multi-faceted approach combining legislation and enforcement, public education and social marketing. It is also essential to involve a wide range of stakeholders, including those who may initially oppose the programme.
- Appropriate and enforceable laws must be in place – mandating use of roadside BrAC-testing equipment and the use of their results as evidence.
- Several devices which permit roadside testing of BrAC are now available to facilitate the enforcement of drinking and driving laws, and results are admissible in court in a number of countries.
- Legal BAC limits range from 0.00 to 0.08 g/100ml. The European Commission recommends 0.05.
- Enforcement efforts should be intelligence-led and aimed at promoting the perception among the driving public that they can be tested anywhere and at anytime.
- Publicity campaigns should include, but not be limited to advertising, and can include launch events and media interviews.
- Campaigns can pass on information, encourage people to change their behaviour, shift attitudes and perspectives, and drive home to agencies their role in road safety. However they are not sufficient in themselves – they must be used as a part of a strategy involving high-profile law enforcement.
- Long timeframes must be allowed for changing public perceptions and behaviour in relation to drinking and driving.
- Post-crash care of alcohol-impaired casualties can pose additional challenges to emergency staff.

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4

How to evaluate the programme

How to evaluate the programme

Monitoring and evaluation of any programme or intervention is vital to determine whether it works, to help refine programme delivery, and to provide evidence for continuing support of the programme. Evaluation will not only provide feedback on the effectiveness of a programme but will also help to determine whether the programme is appropriate for the target population, whether there are any problems with its implementation and support, and whether there are any ongoing concerns that need to be resolved as the programme is implemented.

This module describes the process of developing and conducting an evaluation of a drinking and driving programme. It is divided into three key sections:

- **4.1 Planning the evaluation**: This important initial stage involves collecting data, in a baseline study, to assess the situation before going on to develop the programme. Based on the information collected, it is then necessary to define the aims of an evaluation, and to consider the different types of evaluation methods that could be used for your evaluation.
- **4.2 Choosing the evaluation methods:** Once the type of evaluation has been determined, there are different methods that can be applied to carry out an evaluation. This section describes the different study types possible, explaining the advantages and disadvantages of each type of method. It outlines the types of performance indicators that can be used to measure the success of a programme. This section also briefly describes how to conduct an economic evaluation, and provides guidance on calculating sample size.
- **4.3 Dissemination and feedback:** This section describes how to feed the result of an evaluation back into the planning and implementation stages, as well as ways that the results of an evaluation can be shared with different interested parties.

4.1 Planning the evaluation

The process of designing and implementing a drinking and driving programme was covered in Module 3. Work carried out prior to implementation should ensure that the programme is clearly defined and that it is implemented in a consistent and standardized way. It is far easier to evaluate the impact of a complete, well-planned and executed programme than one that is implemented in an inconsistent way.

It is essential that the evaluation framework is developed and implemented alongside the proposed programme. Thus, this work would be carried out by the working group as they develop the action plan for the programme (see Module 3).
Baseline measures need to be collected before the intervention is put in place so that change in such measures over time may be gauged.

The type of evaluation to be conducted will depend on a number of factors. These include the aims of the evaluation itself, as well as the objectives of the programme being evaluated. The type of methodology chosen may also depend on resource constraints.

4.1.1 Aims of evaluation

The aims of the programme will determine how best to carry out the evaluation. The evaluation will focus on assessing the extent to which the programme objectives have been met, and may have one or more aims. For example, an evaluation of a drinking and driving legislation and increased enforcement programme may primarily be aimed at determining whether drinking and driving rates have reduced as a result of the programme. However, secondary aims may include determining whether the enforcement has increased, whether training of police is effective, and whether the programme is acceptable to the stakeholders. The evaluation in this case needs to be multifaceted.

The breadth of an evaluation will always be limited by the resources available, but note that a well-designed, simple evaluation can be as powerful as a more complex and costly one.

4.1.2 Types of evaluation

Evaluation may take several forms, and one or more may be appropriate, depending on the aims of the specific programme to be evaluated.

Process evaluation

Rather than measuring change in outcomes, this aspect of evaluation examines whether the programme was carried out as planned. This involves creating a list of indicators that need to be measured, depending on the aims of the programme. The results will help to identify the strengths and weaknesses of the programme, and where improvements may be made.

For example, in a media campaign designed to reduce drinking and driving, a process evaluation may ask these sorts of questions:

- Have the campaign products (posters, billboard, radio and television spots) been pre-tested?
- How often were the campaign advertisements run?
- How many people saw them?
- Was the target group being reached?
- If the intervention involves enforcement of drinking and driving legislation:
  - Is there noticeable enforcement by police?
  - Are the police supportive of the campaign?

- Is the penalty sufficient to change behaviour?
- Are people able to circumvent the process (for example, using bribery)?

Process evaluations are what are known as "formative". That is, the enquiries carried out are designed to provide information to guide programme improvement *(1)*. For example, it may be considered important to determine whether the TV adverts shown as part of a drinking and driving programme are appropriate – do they adequately address the issue, does the behaviour portrayed reflect drinking customs in the region where the adverts will be seen?

Impact assessment

This will determine whether the programme has brought about a change. The impact, or programme effect, refers to a change in the target population that has been brought about by the programme – that is, a change that would not have occurred if the programme had not happened *(1)*. For example, if the programme involved airing television advertisements on drinking and driving, the impact assessment might examine whether people who had seen the advertisements believe that there is a good chance that they will be stopped and breathalysed by the police if they drink and drive. Unlike a process evaluation, this would tend to take place at the end of a programme, as the focus would be on the outcome.

Outcome evaluation

This is where the outcomes are measured to see if the programme was successful. Are less people now drinking and driving than before? Have road crashes involving alcohol been reduced? Are fewer injured drivers/riders admitted to hospital with high BAC levels? Measuring a change in outcomes is probably the most common form of evaluation as it provides information as to whether the programme or intervention has actually made a difference.

The US NHTSA *(2)* has developed a guide to evaluating road safety projects. This provides a high-level overview of the steps involved in the evaluation of road safety programmes, from defining the problem to reporting results.

4.2 Choosing the evaluation methods

The methods used for each type of evaluation will vary. Both qualitative and quantitative methods can be used within the design of an evaluation. Qualitative methods may be employed for formative and process evaluations, e.g. focus groups, short-answer or open-ended questionnaires.

Impact and outcome evaluations may be carried out using a variety of quantitative methods. Using an experimental or quasi-experimental design to demonstrate a change (or not) is the most powerful programme evaluation for detecting changes in outcome. The methods used will depend on the aim and the budget for the evaluation.

4.2.1 Study types for formative and process evaluations

Qualitative studies

Qualitative research tends to involve detailed, verbal descriptions of characteristics, cases and settings to explain reasons underlying various behavioural patterns. Specific techniques include using focus groups, in-depth interviews, or surveys with short answers or open-ended questions *(3, 4)*. For example, a question in a formative evaluation of a media campaign aimed at reducing drinking and driving may be whether the television advertisements address the question. Focus groups may be set up to determine whether the audience believes that the message from the television advertisements is appropriate. Feedback will further enhance the development of the advertisement.

Researchers in Ghana evaluated the effectiveness of televised road safety messages on speeding and drink-driving *(5)*. Focus groups were conducted with 50 commercial drivers and addressed coverage, clarity and appropriateness of messages, including suggestions for improvements. The advertisements reached – and were understood by – most of the target audience, although some participants were unclear about the behaviour the advertisements were telling viewers to take. Opportunities for strengthening the messages included using other media, increasing the number of languages and stressing the change in behaviour being recommended.

4.2.2 Study types for impact and outcome evaluations

There is a well-defined hierarchy of study designs for examining the effectiveness of interventions (see Table 4.1). These range from randomised control trials, which provide a high level of evidence, to uncontrolled before–after studies which provide weak evidence about the effectiveness of an intervention.

Table 4.1 Study types and their advantages and disadvantages

	Formative and process evaluation	Impact and outcome evaluation	Pros and cons
QUALITATIVE			
Focus groups/ in-depth interviews	formative – process	– outcome	– Can provide information on why intervention may or may not have worked – Cheap – Sample (participants) are not random sample – Results cannot be generalised
QUANTITATIVE			
Randomised controlled trials		– impact – outcome	– Most rigorous evidence – Expensive – Randomisation not always feasible
Controlled before–after study		– impact – outcome	– Most practical design – Must have comparable control group
Interrupted time series design		– impact – outcome	– Practical design if sufficient numbers of events and accurate surveillance systems in place
Before–after study (no control group)		– impact – outcome	– Cheap – Low level of evidence

Further detail about study types is available in references *6* and *7*. There is also a useful online glossary of epidemiological terms at www.cochrane.org/resources/glossary.htm

Randomised control trial (RCT)

The gold standard of evaluation, the randomised control trial will provide the highest quality level of evidence that an intervention or programme is successful. A RCT design means that individuals or groups of individuals (e.g. a school, or village, known as a cluster randomised trial) are randomly allocated either to receive, or not receive, the programme. As participants (or groups of participants) are randomly assigned to one group or another, other factors that may influence the outcome – measured and unmeasured – are more likely to be balanced between the intervention and non-intervention group. However, although RCT designs should always be considered when evaluating effectiveness of an intervention, they require significant resources and may be difficult to conduct with a limited budget. It may also be difficult to identify a non-intervention group when some aspects – for example changes in the national law, or national television broadcasts – apply to all regions. There may also be ethical considerations in randomising an intervention with known benefits

(that is, in denying an effective intervention to those participants who will be in the non-intervention group).

It is important to note that there is no need to conduct a randomised controlled trial on the effectiveness of reducing drinking and driving as part of the programme. There is overwhelming evidence from many studies that clearly demonstrates that reducing the number of drunk drivers is effective in reducing crashes and the injuries and fatalities that result (see Module 1).

Quasi-experimental designs

These study designs, while not as rigorous as randomised trials, if well conducted may also be used to establish the effectiveness of an intervention. That is, using the information collected on trends of the indicators measured, these studies allow conclusions to be drawn as to whether or not the intervention (the programme) is associated with change in the outcome.

Controlled before-after study

This is often the most practical design for programme evaluation. Randomisation is not always feasible, for example where some areas have already adopted an intervention or some of the changes apply nationwide. The controlled before–after study design involves observing the outcome of interest (e.g. drinking and driving rates) before and after the programme in both the people who receive the programme, and those in a control group. The control group should be as similar as possible to the programme group and any important differences between the groups need to be taken into account. Having a control group means that trends that may have been occurring in the population aside from what was happening as a result of the programme are taken into account.

BOX 4.1: **Controlled before-after study, United States**

"A controlled before-after study was undertaken in the United States to determine whether reductions in alcohol-related fatal crashes following adoption of 0.08% legal BAC limits were independent of general regional trends. The first five states that lowered legal BAC limits to 0.08% were paired with five nearby states that retained at 0.10% legal standard.

The study found that states adopting 0.08% laws experienced 16% and 18% declines in the proportion of fatal crashes involving fatally injured drivers whose BAC levels were 0.08% or higher and 0.15% or higher. The study concluded that if all states adopted 0.08% legal BAC limits, at least 500–600 fewer fatal crashes would occur annually."

Source: *(8)*

Interrupted time series design

It is possible to assess the effect of a programme by using multiple measures of the outcome of interest before and after the programme. There are a number of different variations on this design, some involving control groups. Studies that have used these designs generally use routinely collected measures such as death rates, as multiple measures are required for appropriate analysis. This study design is, however, subject to time-related challenges to its validity and the possibility that other factors occurring simultaneously to the programme actually led to the observed effect. However, statistical analysis of such data can take into account any such secular trends, meaning that it is possible to establish whether the intervention or programme was responsible for the change in outcome.

Before–after study (no control group)

The before–after study without a control group is often used to evaluate the impact of a programme, but provides weak evidence for the effectiveness of a programme. This design involves measuring the outcome of interest before and after the programme has been run. This study design is simple, and may be conducted relatively cheaply as all that is needed is a sampling frame and a research team to conduct observations at various sites. However, without a control group, the scientific merit of these study types is relatively limited as it is often difficult to attribute with any certainty the change in outcome to the introduction of the programme.

BOX 4.2: **Compulsory breath test programme, New Zealand**

Compulsory breath testing (CBT) was introduced in New Zealand on 1 April 1993, following nine years of random breath testing (RBT). Passive alcohol detectors were used for the initial screening. At the same time, the legal blood alcohol limit was lowered from 0.08 for drivers under 20 years of age to 0.03. CBT checkpoints are essentially car-based operations at which all drivers stopped are supposed to be tested. Paid publicity was largely limited to the first three months.

Assessing the effects of the CBT program in New Zealand was difficult because of the lack of a suitable control or comparison group and because, preceding the introduction of CBT, there were large generalised and local changes, such as:

- economic conditions;
- the gradual reduction in the amount of alcohol drunk per person;
- the removal of the number and time-of-day conditions on liquor licences;
- the amalgamation of Ministry of Transport traffic officers with the New Zealand Police;
- the introduction of speed cameras.

It was not possible to conclude that CBT had a positive effect on reducing crashes involving drinking and driving (over RBT). Further work will be required to determine this.

More information: *www.druglibrary.org/schaffer/Misc/driving/s29p3.htm*

4.2.3 Choosing the performance indicators

Performance indicators (or outcome measures) are a measure of how successful the programme has been. They should relate directly to the objectives of the programme. Choice of performance indicators will be determined by the aims of the evaluation, the study type used, the resources available and, to a certain extent, the requirements of the funding agency. For instance, government funding agencies may require certain information to ensure support for increased enforcement or for further roll-out of a programme.

Injury and death outcomes

The impact of alcohol on the human body and its consequent effects in increasing crash risk have been robustly established (see Module 1). There is no need to replicate these findings in a large scale and expensive piece of experimental research. What is less well known in many countries is the extent of drinking and driving, and whether there is a high proportion of victims from crashes where alcohol was a factor.

It is possible to use routinely collected BAC data to establish injury and death rates. However, the efficiency with which such rates can be calculated depends on whether BAC levels are collected systematically for road crash victims, and the accuracy of local surveillance. If there is a uniform capture, coding and reporting system already set up in hospitals and/or health departments there may be aggregated data available on the proportion of crash victims where alcohol is involved. Similarly, crash and/or death data may be routinely collected from police or transport authorities – some of whom may record alcohol presence as a factor.

As quality may be variable, completeness and accuracy of these data sources should be carefully checked before use.

Drinking and driving rates

An appropriate performance indicator is the proportion of riders and drivers who have consumed alcohol, and their BAC levels. To obtain this requires police commitment to stop and breathalyse riders/drivers on a systematic basis. It is also desirable that all riders/drivers involved in crashes be breathalysed as a standard procedure. The trends in observed BAC levels from such tests offer a good basis for tracking changes in the extent to which alcohol is a factor in road crashes.

Calculating rates

Comparing changes in absolute numbers in injury and death outcomes, or in riders/drivers at a certain BAC level, before and after a programme is of limited value, as absolute numbers may change because of an increase or decrease in the numbers of riders and drivers, registered or otherwise, and the numbers of breath or blood tests carried out. It is therefore important that rates be calculated. Denominators may

include number of drivers, registered vehicles, or kilometres travelled. For example, for injury outcomes, a rate may be the number of drink-driving injuries per licensed vehicle or licensed driver/rider, or number of drink-driving injuries per 100 000 km travelled. For alcohol intoxication rates, the appropriate rate would be the proportion of drunk drivers/riders over the total number for which alcohol was measured.

4.2.4 Conducting an economic evaluation of a programme

It may also be necessary to conduct an economic evaluation to demonstrate "value for money" and possible cost savings for government by investing in prevention. Economic evaluation addresses the question of whether one intervention represents a better use of resources than another. In other words, does spending $x on programme A represent a better investment than $y on programme B? To address this sort of question, it is apparent therefore that a comparison of two or more options is needed (often this comparison is with a "do nothing" or "status quo" alternative).

Economic evaluation is based on the comparison of alternatives in terms of their costs and consequences *(9)*. The term "consequences" is used here to represent an outcome of value. There are various forms of economic evaluation that can be conducted – each differing in terms of scope, i.e. the range of variables included in the analysis. Importantly, each form of economic evaluation typically entails a set of starting assumptions; recognition of these is necessary for the policy-maker to make appropriate use of the evidence from such studies.

A common element across all forms of economic evaluation is that they involve measuring costs. Costs usually comprise, at least in part, the direct programme costs – the resources that are used to run the programme (e.g. equipment, staff, consumables). However, in principle, other costs may also be relevant such as those incurred by patients, carers and the wider community. Furthermore, there are "downstream" costs and cost savings that may enter into consideration e.g. a programme may result in reduced hospitalisations and these savings in resources may be deemed relevant. The type of costs selected generally depends on the perspective taken in the evaluation and the nature of the resource allocation problem being addressed.

Methods used in economic evaluation

The most common form of economic evaluation is **cost effectiveness analysis** (CEA). This entails the total cost of programmes alongside a defined outcome to produce a "cost-effectiveness ratio" (e.g. cost per life saved, cost per life year saved or cost per case prevented). The assumption in CEA is that the objectives of interventions being compared are adequately captured in the measure of outcome used *(10)*. One modification to conventional cost effectiveness analysis is cost-utility analysis which is based on an outcome measure, Quality Adjusted Life Year (QALY), that incorporates change in survival and quality of life and thereby enables a wider set of interventions to be legitimately compared than would be possible with CEA.

Another form of economic evaluation, often used to evaluate transport sector investment, is **cost-benefit analysis** (CBA) which seeks to evaluate interventions in terms of total costs and total benefits – both dimensions being valued in monetary terms (e.g. dollars). Therefore if benefits are greater than costs, the decision would be to fund the programme. Valuation of health benefits in this way can be challenging, but one approach would be to elicit from beneficiaries of programmes their maximum willingness to pay for these benefits (i.e. if they had to pay for it in a hypothetical market place). The idea behind this approach is to derive a valuation for an intervention akin to the way in which consumers value goods and services in markets.

Choosing the appropriate type of economic analysis for the needs of the particular programme will depend on resources available (both economic and human), and the aims of the evaluation. Taking quality of life into account is a powerful measure for evaluations of road crashes where lifelong disability resulting from serious injury may be an outcome.

4.2.5 Determining sample size

For all quantitative study types it is important to have sufficiently large numbers in the study to be sure that if an effect exists it is detectable. The rarer the event, the greater the sample size needs to be in order to detect a difference. Serious injuries from road crashes are relatively rare events and a study using serious injury or death as an outcome would involve a large sample size. Measuring drinking and driving rates requires a smaller number of participants.

Factors that must be taken into consideration in determining the sample size are the expected size of the effect to be detected, variability in the measures, and the prevalence of the variable of interest. For a cluster randomised trial, sample size calculations will also take the size of the cluster and correlation within clusters into account. For further information on sample size calculations for cluster randomised trials see reference 11.

Sample size calculators are freely available on the internet[1], but it is wise to consult a statistician regarding such estimates, particularly where cluster randomised trials or random and/or stratified samples are necessary.

Statistical analysis

For quantitative study designs data will require statistical analysis. For more advice on how to go about this refer to reference 6, or see the relevant lectures in the basic methods and injury sections at www.pitt.edu/~super1.

1 The statistical package Epi Info™ may be downloaded at www.cdc.gov/epiinfo
A sample size calculator for cluster randomised trials can be found at www.abdn.ac.uk/hsru/epp/cluster.shtml

BOX 4.3: Estimated savings from measures to reduce drinking and driving In the United States

A study was undertaken by the *Pacific Institute for Research and Evaluation* (PIRE) on behalf of NHTSA to evaluate the economic costs and benefits of impaired driving prevention measures in the United States with the following results:

Administrative License Revocation: State laws that allow police or driver licensing authorities to revoke a driver's license swiftly and automatically for refusing or failing a BAC test have reduced alcohol-related fatalities in the US by 6.5% on average and saved an estimated $54,000 per driver sanctioned. Fees paid by offenders to get their driving licenses back typically cover start-up and operating costs.

Zero Tolerance Law: Nationwide laws making it illegal for persons under 21 to drive with a positive BAC have reduced impaired driving fatalities by 4% on average. Per licensed youth driver, these laws cost approximately $30 and yield net savings of $700. Medical care cost savings alone exceed the intervention cost. The primary cost is the value of mobility lost by youth who are forced to reduce their drinking or driving.

0.08 BAC Law: Well-publicized laws lowering driver BAC limits to 0.08 have reduced alcohol-related fatalities by an average of 7% in 32 States, the District of Colombia and Puerto Rico. On average, 0.08 laws save an estimated $40 per licensed driver nationwide.

Minimum Legal Drinking Age (MLDA): To reduce alcohol-related fatal crashes among youth, all 50 States and the District of Columbia have adopted a MLDA of 21. The MLDA of 21 prevents an estimated 700–1,000 traffic deaths annually among youth targeted. It saves an estimated $540 per youthful driver.

Intensive Sobriety Checkpoint Program: Intensive enforcement of State BAC limits with highly visible sobriety checkpoints would reduce alcohol-related fatalities by at least 15% and save approximately $62,000 per checkpoint. Including police resources, costs of travel delay and the value of mobility losses by impaired drivers apprehended and sanctioned, the costs of conducting a checkpoint averages about $8,800.

Enforcing Serving Intoxicated Patrons Law: Using undercover police officers to enforce the State laws against serving alcohol to intoxicated bar and restaurant patrons would reduce alcohol-related crash fatalities by an estimated 11%. It would cost an estimated $0.30 per licensed driver and save about $20 per licensed driver.

Server Training: Generally, 40% to 60% of intoxicated patrons drive after consuming alcohol in bars, clubs or restaurants. A full-day, mandatory, face-to-face server training program with active management support has the potential to reduce nighttime DUI injury crashes by 17%. Implementing such a program costs an estimated $70 per licensed driver and saves about $200 in crash costs per licensed driver.

For more information and information on the economic evaluation of other drinking and driving prevention measures see *www.nhtsa.dot.gov/PEOPLE/injury/alcohol/impaired_driving_pg2/US.htm*

4.3 Dissemination and feedback

Once an evaluation is complete it is important to provide feedback to the stakeholders involved in the programme. Dissemination of the results will help garner further support for the programme if it is successful, and help others gain support for the introduction of similar programmes. Publicity from dissemination activities may also increase the impact of the programme. If the programme has not been successful it is important to share this with others so that weaknesses or relevant issues are considered in other similar interventions, including whether or not to introduce such interventions.

Dissemination may involve presenting the results at public meetings, using the media to publicise the outcomes of the programme, or publishing reports and papers in the scientific literature.

Checklist

- ☐ Start evaluation process at the beginning of programme implementation.
- ☐ Determine aim of evaluation and develop evaluation framework.
- ☐ Clearly define target population, place and time.
- ☐ Develop and test instruments for data collection, ensuring consistency in training and measurement.
- ☐ Collect and analyse data.
- ☐ Write and disseminate evaluation report, feeding back into various aspects of programme.

Using evaluation results to feed back into new planning cycle

Consider whether the evaluation demonstrated any tangible benefits – should the programme be continued, or does it require disbanding or modification? Can the existing programme be improved on the basis of the evaluation? Have there been any unexpected side effects of the programme?

The results of the evaluation should be fed back into the planning cycle and the appropriate modifications to the programme made before it is further expanded (Box 4.4).

BOX 4.4: **Community action on rural drink-driving – the Waikato, New Zealand Rural Drink Drive Pilot Project 1996–1998 Formative Evaluation Report (1998)**

The 1996–1998 Waikato Rural Drink Drive Project (WRDDP) was established and funded by the Alcohol Advisory Council (ALAC) as a community action pilot to develop strategies which would support rural communities in reducing problems associated with drinking and driving. The project was set up in what was the wholly rural Te Awamutu Police District. The formative evaluation involved taking account of:

- countermeasures implemented as part of the project
- the types, frequencies and outcomes of project meetings
- aspects of the project that were not working and the apparent reasons for this
- solutions that were employed to address hurdles encountered
- material, financial and personnel resources that were required
- project team members' perceptions of the process and impact of the project
- stakeholders' perceptions of the process and impact of the project
- apparent keys to successful operation of the project.

Based on the evaluation it was concluded that by "pooling research-based information and local and national knowledge, experience and ideas, sound strategies could be initiated and supported," and that "health promotion provides a useful guide for the range of strategies and approaches. However, local efforts must be supported by regional and national level agencies, through development or maintenance of appropriate policies. Examples are the need to continue resourcing compulsory and mobile breath testing at efficient levels in rural areas, and mass media campaigns to reinforce this activity. This is particularly important when the public perception remains that it is unlikely they will be breath tested on rural roads."

More information: *www.aphru.ac.nz/projects/rural2.htm*

BOX 4.5: **Evaluation of Checkpoint Demonstration Project, Tennessee, United States**

In 1994 Tennessee initiated and evaluated a statewide sobriety checkpoint programme. The NHTSA, which operates under the US Department of Transportation, funded equipment and the evaluation, while personnel were provided through diversion of existing resources in the highway patrol.

Checkpoints were conducted throughout the state every weekend using four specially equipped vans with generators, lights, cones, signs, video recorders (one to record field sobriety tests outside the van and one to record breath alcohol tests inside the van) and evidential breath testing equipment. Officers also used passive alcohol sensors in flashlights to detect the odour of alcoholic beverages, and standardised field sobriety tests to detect impaired drivers. The number of checkpoints increased from approximately 15 in the preceding year to nearly 900 in the programme year. Nearly 145 000 vehicles passed through these checkpoints. The increased checkpoint activity was publicised extensively through:

- public service announcements (television and radio)
- print media
- outdoor advertising (billboards)
- news coverage
- brochures and other handouts.

Checkpoints were conducted following guidelines contained in the Tennessee Department of Safety General Order pertaining to Sobriety Checkpoints, which requires that at least six troopers and a supervisor staff each checkpoint. On several occasions, typically holidays, the checkpoints were supplemented with enforcement roadblocks, which do not have the same personnel and equipment requirements as sobriety checkpoints.

Evaluation of the program revealed that:

- during the program 773 “driving under the influence” (DUI) arrests and over 8 000 other traffic citations were made
- self-report measures showed increases in exposure to roadblocks (but no substantial change in self-reported drink-driving behaviour)
- nine out of ten people surveyed supported the use of sobriety checkpoints
- there was a 20% reduction in the projected number of fatal drink-driving crashes that would have occurred if there had been no intervention.

More information: *www.nhtsa.dot.gov/people/injury/research/ChekTenn/ChkptTN.html*

Summary

- Evaluation should be seen as an integral component of any drinking and driving programme. An evaluation plan needs to be determined at the beginning of a programme development, so that a plan for data collection for this purpose is built into project implementation. As well as providing information on the effectiveness of a programme, evaluation will help identify if there are any problems in running a programme.
- The aims of the programme must be reflected in the evaluation plan and the performance indicators selected. This will help to decide how best to carry out the evaluation.
- There are a number of different methods that can be used to evaluate a drinking and driving programme. Each method has various advantages and disadvantages, and the choice of which to use will depend on the aims of the programme, and the resources available.
- It is important that the results of the evaluation are shared with the appropriate parties, and that they are used in the planning of future programmes.

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Appendices and acronyms

Appendices and Acronyms

Appendix 1: Factors that impact blood alcohol concentration (BAC)

- **The amount of alcohol consumed** – the more alcohol consumed, the more ends up in the bloodstream.
- **The rate at which the alcohol is consumed** – the liver, responsible for breaking down alcohol, can process approximately the amount of alcohol in one standard drink each hour[1].
- **The amount of food already in the stomach** – if there is food in the stomach it takes the alcohol longer to reach the small intestine and thus longer to enter the bloodstream.
- **The type of alcohol beverage consumed** – some drinks interact with the valves in the stomach to affect how quickly alcohol is able to enter the small intestine.
- **Gender** – women will typically reach a higher BAC than men who have consumed equivalent amounts of alcohol. This is partly because women produce less of the stomach enzyme that breaks down alcohol.
- **Body weight and body type** – BAC is a function of the amount of alcohol divided by the amount of water in the body. In a larger body, which will contain more water, the alcohol is less concentrated. Also, fatty tissue does not absorb much alcohol. As such, the larger the body-fat percentage the more concentrated the alcohol will be in the rest of the body. This is another reason why women, who tend to have a higher percentage body fat than men, will reach a higher BAC than a male of equivalent weight who has consumed the same amount of alcohol.
- **Liver health** – the liver is responsible for breaking down alcohol, and so impairment of the liver function will hamper this process.
- **Medication** – some medications can slow the elimination of alcohol from the body.
- **Genetics** – genetic factors play a role in determining the body's ability to break down alcohol. For example, some people of Asian descent have difficulty metabolizing alcohol because of differing activity levels in some liver enzymes.
- **Tolerance** – after a period of prolonged or heavy use, the effects of alcohol on the body are reduced because of increased ability to metabolize alcohol, and a reduction in the body's sensitivity to alcohol.

1 A standard drink contains between 8–14 grams of alcohol depending upon the definition adopted by the relevant government (ICAP 1998).

ALCOHOL IMPAIRMENT CHART

FEMALE

NEVER DRINK AND DRIVE

# of Drinks	APPROXIMATE BLOOD ALCOHOL PERCENTAGE Body Weight in Pounds/Kilograms									
	90 41	100 45	120 55	140 64	160 73	180 82	200 91	220 100	240 109	
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
1	.05	.05	.04	.03	.03	.03	.02	.02	.02	Impairment Begins
2	.10	.09	.08	.07	.06	.05	.05	.04	.04	Driving Skills Affected
3	.15	.14	.11	.10	.09	.08	.07	.06	.06	Possible Criminal Penalties
4	.20	.18	.15	.13	.11	.10	.09	.08	.08	
5	.25	.23	.19	.16	.14	.13	.11	.10	.09	
6	.30	.27	.23	.19	.17	.15	.14	.12	.11	Legally Intoxicated — Criminal Penalties
7	.35	.32	.27	.23	.20	.18	.16	.14	.13	
8	.40	.36	.30	.26	.23	.20	.18	.17	.15	
9	.45	.41	.34	.29	.26	.23	.20	.19	.17	
10	.51	.45	.38	.32	.28	.25	.23	.21	.19	

Your body can get rid of one drink per hour. Each 1½ oz. of 80 proof liquor, 12 oz. of beer or 5 oz. of table wine = 1 drink. (Each 45 ml of liquor (40% alcohol by volume), 360 ml of beer or 150 ml of table wine = 1 drink.)

ALCOHOL IMPAIRMENT CHART

MALE

NEVER DRINK AND DRIVE

# of Drinks	APPROXIMATE BLOOD ALCOHOL PERCENTAGE Body Weight in Pounds/Kilograms								
	100 45	120 55	140 64	160 73	180 82	200 91	220 100	240 109	
0	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
1	.04	.03	.03	.02	.02	.02	.02	.02	Impairment Begins
2	.08	.06	.05	.05	.04	.04	.03	.03	
3	.11	.09	.08	.07	.06	.06	.05	.05	Driving Skills Affected
4	.15	.12	.11	.09	.08	.08	.07	.06	Possible Criminal Penalties
5	.19	.16	.13	.12	.11	.09	.09	.08	
6	.23	.19	.16	.14	.13	.11	.10	.09	
7	.26	.22	.19	.16	.15	.13	.12	.11	Legally Intoxicated — Criminal Penalties
8	.30	.25	.21	.19	.17	.15	.14	.13	
9	.34	.28	.24	.21	.19	.17	.15	.14	
10	.38	.31	.27	.23	.21	.19	.17	.16	

Your body can get rid of one drink per hour. Each 1½ oz. of 80 proof liquor, 12 oz. of beer or 5 oz. of table wine = 1 drink. (Each 45 ml of liquor (40% alcohol by volume), 360 ml of beer or 150 ml of table wine = 1 drink.)

Source: adapted from *Journal of Studies on Alcohol*, Vol. 42, No. 7, 1981

Appendix 2: Hand-held breath-testing devices

The following table presents a brief overview of a selection of hand-held breath-testing devices and evidential breath-testing instruments.

Technology type	Functionality	Typical application
Chemical reaction (tube and bag)	Low level accuracy, low level specificity, low level training, manual operation, subjective determination of result.	Roadside alcohol screening, presence of alcohol only, low volume use.
Basic hand-held electrochemical reaction (fuel cell) unit	Medium level accuracy, medium level specificity, moderate training, manual sample collection, objective electronic result display.	Roadside alcohol screening, indication of alcohol level, high volume use.
Hand held electrochemical reaction (fuel cell) unit with printer interface.	Medium level accuracy, medium level specificity, moderate training, manual sample collection, objective electronic result display with hard-copy result printing.	Roadside alcohol screening, indication of alcohol level, high volume use.
Hand held electrochemical reaction (fuel cell) unit with data storage printer interface.	Medium level accuracy, medium level specificity, moderate training, automatic sample collection, objective electronic result display with hard-copy result printing, downloadable data storage.	Roadside alcohol screening, indication of alcohol level, high volume use.
Desktop evidential standard, infrared energy absorption (IR) analyser.	High level accuracy, medium to high level specificity, high level training, fixed place of operation, automatic sample collection, objective electronic result display with hard-copy printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location use only.
Desktop/portable evidential standard infrared energy absorption (IR) analyser.	High level accuracy, medium to high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.
Desktop/portable evidential standard dual sensor (infrared energy absorption (IR) at multiple wave lengths) analyser.	High level accuracy, very high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.
Desktop/portable evidential standard IR and EC dual sensor (infrared energy absorption and electrochemical reaction) analyser.	High level accuracy, very high level specificity, high level training, automatic sample collection, fixed/mobile place of operation, objective electronic result display with hard-copy result printing, downloadable data storage.	Evidential standard breath alcohol analysis. Fixed location or mobile use.

Appendix 3: Safe vehicle interception

The process of intercepting moving vehicles and interviewing drivers is a regular part of the traffic officer's duties, therefore a precise and methodical approach must be adopted. The presumption that a motorist, especially a drink-driving one, will stop when directed by police to do so, or that an intercepted motorist will maintain a cooperative demeanour, no longer exists. However, police must always be courteous and polite and maintain a high degree of skill and professionalism. The following is a guide only to safe vehicle interception, as each interception requires planning and an ongoing risk assessment.

Preparing to intercept

Generally police intercept because of a traffic offence, or because the driver or occupants are wanted or suspicious. The suspect must therefore be stopped or apprehended as safely and quickly as possible without endangering the safety of those persons, other motorists or the police. Traffic police must remain aware of any risks that could be present – always consider: "what if?".

- Police and not the motorist must choose the interception point (consider safety at the time and particularly safety after the stop, especially on a busy road or expressway).
- In busy areas use clear zones, bus stops, loading zones (remember double parking is dangerous to everyone).
- Make sure there are no side streets in the vicinity of the interception point where the vehicle can suddenly turn and evade police.
- At night, try to select well-lit areas with a high degree of safety and security.
- Avoid areas where large crowds gather e.g. outside drinking venues or nightclubs – spectators can sometimes complicate a situation.

Signalling the intercept

Once a decision is made to intercept:

- take up a safe position behind the vehicle – the distance will depend upon the particular circumstances but it should not be less than three car lengths;
- move to a position where the driver can see the police vehicle in the rear vision mirror;
- activate the police lights, flash your headlights and/or sound the siren with a short burst to draw attention;
- indicate for the driver to pull over;
- If the driver pulls over in an unsafe location, use the PA system on the police vehicle to direct the driver to a more suitable location.

Be conscious of weather conditions and be aware that the driver may refuse to pull over intentionally or may not hear or know of police presence because of drunkenness, deafness, inattention, loud music etc. Treat every interception with caution as you do not know who you are stopping – the motorist may be a wanted person, or just a nervous citizen. It is important to notify the communications centre of your location and record the vehicle registration number before the interception.

A step-by-step account of safe vehicle-intercept procedures is presented below:

1. Stop the police vehicle one car-length behind, and a half-car width to the left of the other vehicle and in a suitable position to read the rear number plate of the suspect vehicle. This position provides a safety corridor which offers protection to your colleague or yourself from other traffic when interviewing the driver.
2. Activate and leave your police emergency lights and hazard lights on.
3. The police observer, i.e. the passenger, will step out of the police car and watch the suspect vehicle and its occupants. The police observer should approach and stand near the rear passenger side of the suspect vehicle. From here he can watch the driver of the vehicle, any occupants, and also his/her partner.
4. On approaching the suspect vehicle, be alert – watch the occupants, especially their hands. Check the boot, check the seats for objects – baseball bats, iron bars or weapons.
5. When the cover officer (police observer) is satisfied that the motorist will not drive off, he signals the driver of the police car, who should move quickly into the safety corridor. An approach is then made to the driver with the usual greeting. The driver should be asked to turn the ignition off and then the conversation can continue. If the driver is a criminal suspect or a drink-driver, the keys must be taken from the ignition.
6. Always consider the safety factors – be very vigilant with your observations; watch that the door is not pushed open quickly, endangering yourself; always check that there are keys in the ignition (not a stolen car). Is the driver unusually nervous? What are the passengers doing? Keep alert to any unusual hand movements. While there is no need to over-react or be nervous yourself, it is far better to be observant and pick up on early indications of any potential danger rather than be injured or placed in jeopardy because you considered the interception as routine. Your safety is paramount.
7. It is desirable to allow the suspect to remain in the vehicle. This reduces the chance of attack against you. However, if the driver gets out of the vehicle he/she should be asked to move to the footpath or the side of the road as soon as possible. While the driver is doing this, visually check for any danger signals or weapons. Your police vehicle, if positioned correctly, will afford you protection against approaching traffic. You may want the driver to alight from the vehicle. This should always be done in a controlled way for the safety of both the police and the driver. Always take a firm hold of the driver's door as it is opened and ask the driver politely to step outside the vehicle.

8. The engine of the police vehicle should be left running and at night the headlights of the police vehicle should be left on. Always leave your blue light operating to warn other motorists of your presence.
9. Never stand between the police vehicle and the suspect vehicle – in case of a collision from passing traffic or the offending driver reversing into you or the police vehicle.
10. Be careful that you are not injured by the erratic movements of a confused or dangerous driver if they alight from their car.
11. When your enquiries are completed, both members should return to the police vehicle with one member keeping the suspect under observation at all times.
12. Do not relax your caution until the other car has been permitted to drive off. After the check is complete notify the communications centre that you are clear.
13. Wait for the intercepted vehicle to move off first then you move off in consideration of other moving traffic

If you are by yourself in a police vehicle, follow the above process but consider calling for a back-up unit (it is better to call too early, or when not required, than not being able to call at all) and do not advertise or advise the suspect that you are alone, especially at night.

In all cases the police officer must take the initiative and be in control of the situation. You may need to give firm directions, but you should always remain courteous and respectful. The police officer has the advantage of skill, knowledge and a professional attitude to ensure that the situation remains calm. This makes it less traumatic for the driver, easier to handle for the police officer and a less dangerous situation overall. The use of courteous expressions has the following advantages:

- if the driver is nervous, it puts them at ease;
- if the driver is aggressive, your courteous approach can be verbally disarming and change the tone of the conversation;
- if they continue to be aggressive then you are maintaining your professionalism, and because of your attitude and actions you can think clearly.

Failure to stop when requested by police

When a driver fails to stop following a police direction or persistent police directions, you must assume that the driver does not want to or does not intend to stop. You must assume that because he/she has decided not to stop (and like any other person escaping) that they are dangerous. Remember – an offender's vehicle is their most effective weapon.

- Notify the communications centre and request back-up.
- Make sure that you have recorded the registration number and description of the vehicle and driver/passengers.
- Never move alongside the vehicle in this situation because:
  - if they are armed, your vehicle and yourself then become targets;
  - the offender may suddenly turn or crash into your vehicle;

  - the offender may turn into a side street, gaining an escape advantage;
  - it is a potentially dangerous manoeuvre for a number of other reasons e.g. in some countries it is common for the offending driver to force the police vehicle onto the wrong side of the road, thereby exposing it to oncoming traffic and the dangers of a head-on collision. Even on an expressway, the offender can nudge the police vehicle, putting it off balance and making it hard to control.
- Decide on a plan to resolve the situation. This may include continuing to follow the vehicle. Call in more resources or abandon the interception – whatever is the most practical in consideration of the law, police policy and all safety factors.
- Remember, emergency provisions allow the police to do a number of lawful actions – they do not include driving in a dangerous manner, at a dangerous speed, or reckless driving.

The most important aspect of any interception is the safety of the police officer, the safety of the citizens and the safety of the offenders or suspect. Always plan ahead and expect the unexpected.

Appendix 4: Different types of publicity campaigns

Information campaigns

Information campaigns are used when there has been a change in the law or road rules affecting road users and there is a need to ensure the public have been informed of the new rules. A good example is where the rules for the maximum allowable blood alcohol level for drivers is changed.

Additionally, campaigns of this type can be undertaken when target-group research has identified that road users are ignorant of the rules, or people use their ignorance as one of the excuses for not changing their behaviour. For example, some drunk drivers use the excuse that they didn't know it was illegal, or that they were not told it was illegal.

Information campaigns should be designed to reach a very wide audience. The content must be factual and explanatory. There is rarely a need to use persuasive or emotional images or language in campaigns of this type. Distribution of follow-up information, such as explanatory leaflets, can be an important component. These should be widely available at transport registry offices, police stations, petrol stations, roadside restaurants and other areas where the public can easily access the information.

Persuasive behaviour-change campaigns

Campaigns designed to persuade road users to amend their behaviour, or to consider new attitudes to their use of the road, are *the core of road safety publicity*. Although a considerable amount of research is still being conducted on the psychological "linkage" between knowledge, attitudes and behaviour, some people would advocate that information (or knowledge) helps to determine and shape attitudes; and that attitudes (among a number of other key factors) are important determinants of behaviour.

Such a "behavioural" model is a good starting point for trying to influence behaviour, although other factors such as "perceived control" *(1),* habit *(2)* and even culture and social factors *(3)* are likely to play a key role. Behaviour change campaigns must be undertaken with the support of other initiatives, the most important activity being traffic enforcement. Inevitably, behaviour-change campaigns require individuals to change what they currently do on the roads. In almost all cases, individuals and road users *do not want to change.* Consequently, they will oppose the campaign, they will object to the campaign message and they will always look for reasons why the campaign message does not apply to them.

These circumstances mean that the task confronting persuasive/behaviour-change campaigns is vastly more difficult than any other form of public communication, and makes the task of product advertising look simple in comparison. Evidence shows that while the skills of advertising agencies are important to developing effective campaigns they must be guided to ensure the best outcomes *(4)*.

Where legislative support does not exist to support the relevant behaviour, publicity campaigns have been shown to be very weak in their effectiveness. A good example is the "Speed Kills" campaign, commenced in Victoria, Australia in 1990 and linked to a wide-ranging programme of initiatives that included high levels of increased police enforcement. This campaign recorded substantial reductions in injury outcomes linked to the publicity levels, creative approach and police enforcement activity. On the other hand, a second campaign, "Concentrate or Kill", used identical publicity levels and creative approach, but without enforcement of any relevant traffic law. This campaign failed to show any significant outcomes in post-campaign evaluation *(5)*.

Agenda-setting campaigns

Agenda-setting campaigns are used to broaden public understanding of key issues or problems in road safety, and seek to gain public support for action to be taken, usually some time in the future.

Agenda-setting campaigns can be valuable when road safety research has identified the need for an initiative, but market research has identified a lack of public awareness of the specific problem, or even public apathy and opposition to effective countermeasures.

In these circumstances, the authority responsible for achieving improvements in road safety faces a difficult task to obtain approval for the countermeasure and to generate the necessary budget and expenditure that might be required. In the context of road crashes involving drinking and driving, market research in a country or jurisdiction may identify that people are unaware of the effects of alcohol on the body, or more particularly, the level of involvement of alcohol in road trauma and the impacts of that trauma on the community. These are the circumstances in which an agenda-setting campaign should be mounted. Its objectives would be to shift the understanding and awareness of the relevant target groups so that the issue and its importance become understood. This understanding should be seen as a necessary pre-condition to generating the public and political support required to attempt to change the behaviour in a follow-up behaviour-change campaign.

Agenda-setting campaigns often have large components of information as part of the campaign, so in this respect are similar to information campaigns. Additionally, however, these campaigns must seek to address public consciousness and heighten public

concern over the issue. Consequently these campaigns will also require some of the persuasive approaches used in behaviour-change campaigns.

Inter-organizational campaigns

Because of the multi-disciplinary nature of road safety, staff in public works departments, police officers, transport departments, hospitals and others need to support strongly any programme developed, and to understand the safety benefits that can be achieved from implementing road safety programmes.

For this reason, inter-organizational campaigns often target the staff and officials of major agencies responsible for road safety. These staff are at the frontline of contact with the public, and are sometimes subject to public inquiry and abuse in relation to campaigns that target behaviour change. Inter-organizational campaigns can provide such staff with the information and support designed to counter public criticism.

A further reason for these campaigns is to drive home to frontline staff the importance of the example they set for the public. If transport officials drive vehicles without wearing seatbelts, if police officers ride motorcycles without helmets, if bus drivers are seen to be drunk, if teachers ride home on scooters which have bald tyres and are not maintained, if public buses are allowed to drive on roads without full lighting, or if police drive on the wrong side of the road, then the public will take the attitude that the major officials really do not care about the problem and do not see it as important.

Inter-organizational campaigns are designed to drive home the importance of modelling safe behaviour and the pivotal role of key agencies and their staff in building a sustainable road safety programme.

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Acronyms

ALS	Advanced life support
ATSB	Australian Transport Safety Bureau
BAC	Blood alcohol concentration
BATF	Bangalore Agenda Taskforce
BCC	Bangalore City Corporation
BDA	Bangalore Development Authority
BLS	Basic life support
BMTC	Bangalore Metropolitan Transport Corporation
BrAC	Breath alcohol concentration
CEA	Cost effectiveness analysis
CBA	Cost-benefit analysis
CIROS	Citizen's Road Safety Group
DDR	Drink/drive rehabilitation
DWI	Driving while intoxicated
EMS	Emergency medical services
FIA	Fédération Internationale de l'Automobile
FORS	Federal Office of Road Safety
GRSP	Global Road Safety Partnership
ICAP	International Center for Alcohol Policies
LMIC	Low and middle-income countries
MADD	Mothers Against Drunk Driving
MLDA	Minimum legal drinking age
MP	Members of Parliament
NHTSA	National Highway Traffic Safety Administration (USA)
NIMHANS	National Institute for Mental Health and Neuro Sciences
PAADD	PATVORA Awareness Against Drunk Driving
PATVORA	Prompt Assistance to Victims of Road Accidents
QALY	Quality adjusted life year
SARTRE	Social Attitudes to Road Traffic Risk in Europe
TRL	Transport Research Laboratory
WHO	World Health Organization

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